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The Macroeconomics of Presidential Popularity.

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THE MACROECONOMICS OF PRESIDENTIAL POPULARITY

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ABSTRACT

This thesis examines several issues dealing with the public's social preference function between inflation and unemployment. First, the preference function is estimated as a nonlinear function. Second, the thesis analyzes the ability of a presidential administration to improve its popularity level by exploiting a short-run Phillips curve. Finally, preference functions disaggregated by sex, race, political party, and geographical region are estimated. Presidential approval levels are proxied by monthly Gallup Poll approval data.

Chapter One serves as an overview of the current body of literature. While theoretical analyses of macroeconomic policy have traditionally assumed that the public's social preference function is concave to the origin, in practice most empirical studies estimate a linear relationship between presidential popularity, inflation, and unemployment.

The majority of the empirical work assumes that the impact of macroeconomic variables on political popularity remains constant across presidential regimes. Chapter Two applies appropriate tests for structural change to the data. The results indicate that structural change in economic perceptions does take place between presidential regimes and thus that each regime should be estimated separately.

The econometric study in Chapter Three examines the popularity of each president from Eisenhower to Reagan. For

a majority of the presidential administrations, it demonstrates that the public's trade-off between inflation and unemployment is nonlinear. This nonlinearity indicates that the marginal rate of substitution between inflation and unemployment varies with the relative rates of the macroeconomic variables.

A major question of policy importance is whether or not an administration can increase its popularity in the short-run by exploiting a short-run Phillips curve. Chapter Four estimates the Phillips curves and provides evidence that while it is theoretically possible for a president to create a political business cycle, the gains in popularity are so small as to make the activity not worthwhile.

Chapter Five examines presidential approval on a disaggregated level. There exists extensive Gallup Poll data disaggregated by sex, race, political party, and geographical region. Nonlinear social preference functions are estimated for each of these groups.

Chapter Six provides a summary of the results discussed in the thesis.

CHAPTER 1

Introduction and Review of the Literature

1.1 An Overview

During the past two decades there has been a tremendous surge in interest in the interaction between the economy and political popularity. Both economists and political scientists have examined the interdependencies in what has come to be known as the political business cycle. This thesis examines the role inflation and unemployment have played in determining presidential popularity from the Eisenhower administration through the Reagan regime. It also explores the extent to which a president may increase his popularity by manipulating the economy and creating a political business cycle.

Election returns express perhaps most definitively the public's assessment of the politician. Since elections are held at relatively long intervals, however, opinion polls serve as an intermediary gauge of public approval. Though these polls do not reflect precisely what election outcomes will be, they do provide a good measure of public sentiment.

A plethora factors influence the public's assessment of a president. The public tends to hold the president responsible, rightly or wrongly, for both domestic and international issues and politicians recognize this. Mueller (1980, 18) quotes Lyndon B. Johnson:

> I think [my grandchildren] will be proud of two things. What I did for the Negro and seeing it through in Vietnam for all of Asia. The Negro cost me 15 points in the polls and Vietnam cost me 20.

The sections which follow will examine in more detail the impact of "events" on popularity.

As economists, we are more concerned with the effects of the economy on popularity. Though the monetary and fiscal policies designed to affect the economy involve a joint effort by the President, the Congress and the Federal Reserve, the public nonetheless holds the president responsible to a large extent for the state of the economy. Tufte (1978, 5) gives evidence that politicians are well aware of this fact. He quotes Walter Heller, chairman of the Council of Economic Advisors from 1961 to 1964 as saying,

> As a political leader, President Johnson has found in modern economic policy an instrument that serves him well in giving form and substance to the stuff of which his dreams for America are made, in molding and holding a democratic concensus, and in giving that concensus a capital "D" in national elections. That chill of recession may have tipped the Presidential election in 1960, and that the bloom of prosperity boosted the margin of victory in 1964, is widely acknowledged, especially by the defeated candidates.

Tufte (1978, 6) also indicates that Richard Nixon was acutely aware of the impact of the economy on political popularity. He reproduces a portion of Nixon's Six Crises:

> The power of the "pocket-book" issue was shown more clearly perhaps in 1958 than in any off-year election in history. On the international front, the Administration had had one of its best years....Yet, the economic dip in October was obviously uppermost in the people's minds when they went to the polls. They completely rejected the President's appeal for the election of Republicans to the House and Senate.

Though many variables may be employed to represent economic prosperity or malaise, perhaps the two most frequently chosen to proxy economic activity are inflation and unemployment rates. These economic statistics are widely available to the public on a consistent basis and their effects are fairly well understood. Increases in either variable are seen as a worsening of the economy and thus cause popularity to decline.

The objective of the remainder of this chapter is to review the existing theoretical and empirical literature dealing with the presidential popularity function and the social indifference map between inflation and unemployment which may be derived from it. As such, the chapter will survey only a very specialized portion of the political business cycle literature. It excludes a lengthy discussion of the political business cycle itself and deals only with presidential popularity, excluding literature on Congressional election returns and a large body of work

examining the possibility of a political business cycle in the monetary supply.

Section 1.2 presents the theoretical underpinnings of the social preference function. Section 1.3 follows with a discussion of selected empirical works. This section examines treatment of the dependent variable, functional form, inclusion of economic and noneconomic variables by various researchers, and finally the estimation techniques employed. The chapter conclusions are presented in Section 1.4 which also paves the way for the empirical work to follow.

1.2 Theoretical Underpinnings of the Concave Social Indifference Map

From a given presidential popularity function which includes inflation and unemployment, it is possible to derive a social preference curve. This curve presents all combinations of the two macroeconomic variables which yield a constant approval rating. The public's indifference map relating inflation and unemployment was first assumed to be concave to the origin by Lipsey (1965) who used a simple theory of choice model. He assumed that policymakers have a preference function which contains many factors, among them economic variables, specifically inflation and unemployment. The higher the rates of inflation and unemployment in a particular period, the lower the preference for the policy.

Nordhaus (1975) modified this analysis to assume that the public has a similar social preference function in which its approval of a president is dependent partially upon economic factors. Indifference curves, such as I_1, I_2, and I_3 in Figure 1.1, are drawn to reflect decreasing levels of collective approval as we move toward the origin.

Both inflation and unemployment have negative marginal utilities and the marginal rate of substitution between the two is negative; thus, the curves are downward sloping. In conventional utility theory, indifference curves are typically drawn convex to the origin, but since the public is forced to choose between two "bads" in this case, the indifference curves are concave to the origin. At high rates of inflation and low rates of unemployment (the upper lefthand portion of the curve in Figure 1.1) the public will tolerate a relatively large increase in unemployment in return for reduced inflation. When inflation is relatively low and unemployment relatively high (the lower righthand portion of the curve in Figure 1.1), the public will not tolerate much additional unemployment to gain a lower inflation rate. This behavior causes the concavity of the social preference function.

The American public has made it clear that both unemployment and inflation are undesirable. Losses due to unemployment are relatively easy to pinpoint. As unemployment rises, real GNP and real incomes fall. The

costs of inflation are a bit more difficult to see directly, yet the public has shown their displeasure with high inflation rates by denying reelection to two recent incumbants, Ford and Carter, after experiencing large bursts of inflation. Some specific costs of inflation, though they are admittedly hard to quantify, include reduced purchasing power, the "shoe leather" costs of conserving money balances, the capricious redistribution of income from creditors to debtors, the losses due to the inability to correctly anticipate increases in inflation and adjust one's economic behavior accordingly, and distortions due to a tax system which may not fully indexed. In addition, some individuals may not understand the relationship between income and rising prices and thus see higher prices as necessarily implying decreased real income.[1]

To summarize, each concave indifference curve represents a locus of combinations of inflation and unemployment which yield the same approval rating for the president. Since lower unemployment and inflation rates are

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[1]For more technical information see Laidler and Parkin (1975), Okun (1975), and Nordhaus (1975); for a textbook discussion see Hall and Taylor (1988, 487-491). Nordhaus (1975, 172) points out the possibility that inflation may be a "bad" for the rational individual but not for society as a whole. Individuals may feel that inflation is a "tax" on income which in the aggregate nets out to zero. As Nordhaus states, "...the price rises might be visible, while the offsetting effect of price rises on income--flowing through higher wage rates, dividends, and transfer payments--might not be associated with the inflationary process in the individual's perception."

preferred to higher rates, curves closer to the origin represent higher approval ratings.

As Brechling (1968, 715) has pointed out, the above description is based upon two assumptions. First, the indifference curves depicted assume that the collective utility functions are analagous to those for individuals. While this is a "leap of faith" which some may not agree with,[8] Brechling asserts that it is plausible if we assume enough "political freedom" so that a nation may arrive at a collective utility function which is like that of the individual. Second, the indifference map is drawn ceterus paribus, or assuming that all other factors influencing the public's perceptions of the president remain unchanged. Changes in factors such as foreign policy, domestic violence, and other such issues may cause the curve to shift but do not determine the slope of the curve.

As was alluded to previously, Lipsey (1965) was one of the first to formally delineate the nonlinear relationship between the two economic variables, his work within the context of reducing unemployment to some "optimal" level. Brechling (1968) also utilized this tool in his more

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[8]Lepper, (1974, 68) for instance, identifies a situation in which the "...constant vote curves V_k, are not smooth and need not be concave. The obvious case of non-concavity occurs if voters' preferences are polarized so that one group tolerates extreme values of [inflation] but not of U,...while another group has little tolerance for extreme values of [inflation] but tolerates very large U."

extensive look at the unemployment-inflation tradeoff with emphasis on the Phillips Curve relationship.

Perhaps one of the best known theoretical analyses employing the concave social preference function is Nordhaus' (1975) "The Political Business Cycle." Nordhaus develops a model in which an administration attempts to maximize a quadratic vote function subject to the constraint of the short-run Phillips curve. In the short run a politician may increase his popularity by exploiting the short run Phillips curve, reducing unemployment and raising the inflation rate, thus improving popularity prior to an election. After the election as inflation expectations are revised upward thereby shifting the short run Phillips curve upward, the inflation rate rises, unemployment rises, and popularity once more falls. Textbook presentations of this political business cycle model may be found in Peston (1974), Westaway and Weyman-Jones (1977), Boyes (1984) and Hall and Taylor (1986). Similar representations are found in MacRae (1977) and Barro and Gordon (1983).

1.3 Empirical Estimation of the Presidential Popularity Function and the Social Preference Function

This section attempts to highlight the various empirical issues associated with the presidential popularity function and to outline the manner in which researchers have chosen to address these issues. The selection of the

dependent variable will be examined first. Research will then be broadly grouped by the emphasis placed on the regressors: major emphasis placed on time and noneconomic events, major emphasis on economic events only, and joint emphasis on the economy and political events. Appendix I provides a brief summary of the information presented in the following section.

1.3.1 The Dependent Variable

By far, the most common measure of presidential approval is the percentage who respond "approve" to the Gallup Poll question "Do you approve or disapprove of the way Mr. _____ is handling the job of president?" Of the works sited in the following paragraphs, Meuller (1970), Stimson (1976), Kenski (1977ab), Frey and Schneider (1978), Golden and Poterba (1980), Chappell (1983), Chappell and Keech (1985ab), and Michaels (1986) employ quarterly measures of the series in time spans beginning as early as 1953:1 and ending as late as 1980:4. Kernell (1978), Monroe (1978, 1981), Ostrom and Simon (1985), and Peel and Jones (1987) all employ monthly data in time spans ranging from 1953:1 to 1980:12. Smyth, Washburn, and Dua (1989ab) is the only work to extend the analysis to the Reagan administration.

Kenski (1977a), Norpoth and Yantek (1983), and Maloney and Smirlock (1981) use the first difference of the monthly

Gallup popularity series as the dependent variable, thus seeking to explain changes in popularity rather than absolute levels. Monroe (1984) employs first differences on a bi-monthly basis. Norpoth and Yantek indicate that they set the difference between the last month of an outgoing presidency and the first month of an incoming presidency equal to zero. Kenski and Maloney and Smirlock do not report having made such an adjustment.

Stimson's (1976) dependent variable is yet another variation on the Gallup measure as his is the quarterly percentage approving as a portion of all those expressing an opinion. Since the precentage expressing no opinion remains fairly constant over time, however, this is not a major difference.

Shapiro and Conforto (1980a) use another variation of the Gallup measure. They employ the percentage change in those disapproving of the president's performance derived from yearly data spanning 1947-1975. They exclude the change for 1950-51, 1973-74, and 1974-75 because these values were abnormally high without any apparent economic cause. This leaves them with a rather limited data set. In addition, they do not report having made any data adjustment at the beginning of a new administration so that the first year's value for a new administration may be dependent upon the final popularity rating of an outgoing administration.

Arguing that actual election outcomes are more relevant than opinion polls which are nonbinding, Fair (1978) uses as his dependent variable the percentage voting for a Democrat in presidential elections from 1916 to 1976. A major defect of this measure is that it allows only a limited data set of 16 observations.

MacKuen (1983) combines responses to Gallup, Harris, CBS-New York Times, NBC-Associated Press, and Roper survey questions to derive his approval measure. He feels that this larger number of observations taken from 1963 to 1980 provides greater precision. Though the question formats vary somewhat, he introduces dummy variables to account for the differences.

Smyth and Dua (1988, 1989) assert that while the Gallup measure has been widely used, it is not entirely satisfactory to the economist wishing to study the public's reaction to inflation and unemployment. Gallup popularity is dependent upon noneconomic as well as economic factors and the noneconomic influences may dominate. While one might include control variables to account for these political phenomenon, there are many political events which are difficult to account for empirically. As an alternative measure, they employ data gleaned from responses to the Survey Research Center of the University of Michigan question "As to the economic policy of the government--I mean steps to fight inflation or unemployment--would you say

the government is doing a good job, only fair, or a poor job?" "Government" in this context is interpreted to be synonomous with the leader of the government, the president, though one might argue that this term might also apply to Congress as well. They utilize monthly data for the Reagan administration and quarterly data for the Nixon through Reagan years ending both analyses in November of 1986. This rating measure is superior from the economist's viewpoint because it specifically highlight's the public's satisfaction with the president's economic performance.

Kernell (1978) and Smyth and Dua (1988a) include as a regressor a lagged dependent variable when using monthly data. Their argument is that the president's approval rating will respond slowly to changing events. During the short intervals between popularity polls the public may maintain their current assessment of the president regardless of intervening events. Since Smyth and Dua use monthly data for one administration only, no adjustment is made in the data set. Kernell, however, does not report having deleted the first observation of each new administration.

1.3.2 Popularity as Explained by Time or Political Events

One of the earliest pieces to empirically explore presidential popularity is Mueller's often cited "Presidential Popularity from Truman to Johnson" (1970).

Mueller posits that popularity will always decline over time due to a "coalition of minorities" effect. According to Mueller (1970, 20), "...this concept might inspire the expectation that a President's popularity would show a general downward trend as he is forced on a variety of issues to act and thus create intense, unforgiving opponents of former supporters." Empirically, the coalition of minorities variable is represented by a time trend. Similar logic applies to the inclusion of time trends by Stimson (1976) and Frey and Schneider (1978).

Mueller adds to the popularity function a "rally" variable capturing increases in popularity due to international crises and similar events which give the President a short-run increase in popularity. Though the concept is pleasing theoretically, there are difficulties in forming the variable for empirical testing. Mueller (1970, 22) undertakes a rather complicated process of forming "rally points" by examining news coverage of major international events. The rally variable is then measured as the length of time, in years, since the last rally point. The variable was formulated for the entire period as well as for each administration. Though the variable does provide some measure of political support due to international events and though it has been borrowed by several other researchers, its measurement is slightly arbitrary. Kernell

(1978) also employs this measure. In most cases the rally coefficient is insignificant or of marginal significance.

To capture the effect of the economy on presidential popularity, Mueller includes an "economic slump" variable. It is measured as the change in unemployment since the president took office and is expected to have a negative impact on popularity. If the current unemployment rate is lower than that existing when the president took office, then "economic slump" is given the value of 0. This implicly assumes that a president is punished if the economy worsens but is not rewarded if conditions improve. In addition, since no measure of inflation is included in the popularity function, the public is implicitly assumed to be unconcerned with this phenomenon.

Mueller estimates his model using quarterly Gallup Poll presidential approval data for the Truman through Johnson administrations. In addition to the variables discussed above, his most complete popularity function includes dummy variables representing each administration and binary "war" variables capturing the effects of American military intervention in Korea and Vietnam on popularity. Using ordinary least squares (OLS), Mueller found all the variables to be statistically significant with the exception of the Vietnam dummy. These results are subject to question, however, because of the presence of serial correlation for which no adjustment is made. Mueller's

basic conclusion, then, is that while economic and political events do effect popularity, a president is cursed by a popularity rating which declines constantly over time due to what he terms a "coalition of minorities".

Stimson (1976) modifies Mueller's research by fitting a parabola to presidential approval rather than allowing a purely linear decline in popularity over time. His basic model is a parabolic time trend to which he later adds Mueller's economic slump, rally, and binary war variables. His conclusion (Stimson 1976, 18) is that the addition of "three such promising candidates for the explanation of presidential approval (fails) to disrupt the time/approval relationship and (adds) little...leads naturally to the suspicion that nothing else matters <u>much</u> (emphasis his)." Though Stimson notes the complications caused by positive serial correlation and multicollinearity, no empirical adjustment is made for the problems.

Kernell (1978) casts serious doubt on research which finds the economy unimportant. He posits that previous work on presidential popularity places too much emphasis on time and that the results are generated largely by a mis-measurement of variables. He estimates a popularity function for each president from Truman to Nixon using monthly data and allows for an adjustment process by including a lagged dependent variable.

Kernell's measurement of macroeconomic variables is far more complete, employing six month changes in unemployment and in the consumer price index. Additionally, the effect of war is measured as the number of casualties during each month for both Korea and Vietnam and as the number of bombing missions over North Vietnam per month, thus modelling the public's growing dissatisfaction with these military conflicts. Similar Vietnam casualty figures have been employed by Chappell (1983), Chappell and Keech (1985ab) and Kenski (1977ab). The rally variable employed by both Meuller and Stimson is modified so that only international events are accounted for and these have an effect on popularity over a five-month period only. The honeymoon variable employed is analogous to that of Meuller.

The model is estimated for each administration by OLS and serial correlation is corrected using an instrumental variable technique developed by Malinvaud. The resulting unemployment coefficients are neither large nor significant, but the inflation coefficients are sizeable for a majority of the presidents, though not all are significant. MacKuen (1983) reports similar findings. According to Kernell (1978, 18), these results "fail to establish the Iron Law of the Economy, (but) they do inform us that changing economic conditions can have an important effect on the president's public standing."

In a more recent attempt to analyze the effect of time on popularity, Peel and Jones (1987) contrast the "electoral cycle effect" in which only time changes the approval rating with the "expected future benefits hypothesis" in which agents support the party which offers the largest net present value of expected future benefits. Popularity data for 19 parties in six countries as well as for U.S. presidential approval is transformed by an ARIMA (0,1,1) process. These series are then regressed on a number of variables designed to represent electoral-cycle effects. Such regression analysis appears to yield some support for the electoral-cycle effect but, once more, the presence of serial correlation makes reported t-values highly suspect. The OLS regressions were repeated using the first difference of the popularity series as the dependent variable. After this adjustment to eliminate serial correlation, no electoral cycle variables were statistically significant.

Several researchers have focused on modelling the impact of political events, both domestic and international, on presidential popularity. While economic data are easily obtained and time trends easily formed, it is far more difficult to quantify political events. Though arbitrary in nature, Mueller's "rally 'round the flag" variable described above was one of the earliest attempts to empirically measure the political atmosphere.

Ostrom and Simon (1985) present one of the most comprehensive analyses of popularity as dependent upon "events." Their objective is to develop a generalized model which may be applicable to any president. Monthly Gallup popularity data from 1953:1-1980:12 are regressed upon 12 broad factors including the economy, legislative success, conflict with the Soviet Union, war, social unrest, scandal, domestic and international policy, and personal events. These events are weighted by the extent of media coverage given the event and in some cases by the percentage of the population concerned with the event.

Ostrom and Simon estimate a simultaneous system by two-stage least squares in which popularity is assumed to be dependent upon legislative success and legislative success, in turn, is dependent upon the level of popularity. Serial correlation in the initial estimation leads to a correction using an ARIMA prewhitening procedure. They find that all variables in the popularity function are significant with the exception of social unrest and domestic policy. Foreign policy tends to play the largest role in determining popularity. In addition, there seems to be a potential "vicious cycle" between popularity and legislative efficiency as declines in popularity lead to declines in legislative success which in turn has a negative impact on approval.

As with Meuller's rally variable, the measurement of many of the unanticipated events determined through newspaper searches may be somewhat arbitrary. In addition, the results may be distorted because the measurement of the economy is not satisfactory. The impact of the economy on approval is represented by a misery index (the rate of inflation plus the rate of unemployment) multiplied by the percentage of Gallup poll survey participants citing either variable as the top problem facing the country. This measure is unsatisfactory for two reasons. First, it understates the impact of the economy on popularity as many people who reveal that another problem is of highest priority are nonetheless concerned with the state of the economy. Second, employing a misery index implicitly assumes that inflation and unemployment have equal impacts on popularity. This restriction is not necessarily appropriate.

1.3.3 Popularity as Explained Solely by the Economy

Several researchers have focused exclusively upon the role the economy plays in determining presidential popularity. Among these are Kenski (1977ab), Shapiro and Conforto (1980ab), and Michaels (1986).

Kenski (1977a) endeavors to find the "correct" measures of inflation and unemployment to be used in the popularity function by utilizing a series of univariate regressions. He regresses monthly Gallup approval data from the

Eisenhower to Nixon administrations on various measures of unemployment and inflation both for the entire time period and for each individual administration. The inflation and unemployment measures analyzed are a monthly rate, a six-month moving average, and changes in each of the previous values. Inflation is measured by both the consumer price index and as the change in food prices. Kenski finds that unemployment is often of the wrong sign and statistically significant. With respect to inflation, he concludes that the change in the six month moving average of general prices is the best measure.

Kenski's work is subject to several criticisms. First, no consideration is given to any influence on popularity other than economic. In the regression covering the entire time period, no dummy variables representing various administrations, honeymoon effects, Watergate, or Vietnam are included, variables which have proven significant in other research. The exclusion of relevant variables can lead to serious misspecifications of the relationship. In addition, no correction is made for serial correlation though it is mentioned as a potential problem in the closing statement. Though he states that the note isn't intended to be definitive but rather suggestive of the measurement of unemployment and inflation, correction of these methodological discrepancies might well alter his conclusions.

In a very similar piece, Kenski (1977b) attempts to analyze the impact of inflation on popularity. He isolates inflation because it is consistently significant in previous literature while unemployment is often statistically insignificant and because inflation affects a larger portion of the population than does unemployment. As a dependent variable, Kenski employs quarterly Gallup data from 1953:1-1974:4 measured as the level of approval and as the change in approval over the quarter. Two measures of inflation are examined: a six month moving increase in general prices and in food prices. He eliminates the first six months of each new administration in order to form the six-month moving average. The model is estimated by OLS for the entire period and for each administration. This work does improve on the previous article cited because two political dummies are included: a "rally" variable and a war variable both as defined by Mueller. However, no attention is given to presidential dummy varibles in the regressions for the entire period and the effect of Watergate on the Nixon administration is omitted.

With respect to results, the equations employing the change in popularity exhibit no serial correlation, but most variables, including the inflation variables, are insignificant. For the level of approval, inflation is statistically significant but this result is marred by the presence of autocorrelation. Kenski (1977b, 89) concludes

that "although the theoretical case for the impact of inflation on presidential popularity is appealing, it is not borne out by an empirical analysis which posits linear relationships."

Shapiro and Conforto (1980a) emphasize the importance of economic perceptions as a criterion for evaluating presidential performance. The major innovation in their work is the inclusion in the popularity function of a variable which reflects the percentage of people who feel they are worse off now (WN) financially than they were a year ago, as gleaned from the Survey of Consumer Finances. Popularity is regressed on WN in addition to the yearly change in quarterly averages of inflation and unemployment. Due to the use of first differences, serial correlation presents no problem. Shapiro and Conforto find both of the economic variables as well as the WN perception variable to be statistically significant, indicating that both public impressions of the economy as well as actual values of economic variables affect presidential popularity.

Kenski (1980) notes several deficiencies in the preceding analysis. First, the authors all but ignore political variables, thus artifically inflating the importance of the economic variables. No distinctions are made by administration or presidential term. While this is a valid criticism, it is somewhat ironic that Kenski's own work cited above suffers the same shortcoming. Kenski

argues that with such a small data set more statistical tests should be conducted to verify results. Third, he asserts that the exclusion of outliers is done on a purely arbitrary basis and that this exclusion may play a major role in the final results. Finally, he points out that the inflation and unemployment variables are necessarily highly correlated with the "worse now" variable, thus including both is inappropriate and redundant.

The role of anticipated versus unanticipated inflation in determining presidential popularity is the subject of Michaels (1986). He asserts that if all inflation is anticipated, money will be neutral and thus inflation would have no noticeable impact on popularity. Inflation's redistributive effects are felt only if it is unanticipated thus this is the single case in which inflation will affect approval.

Michaels examines two models which assume extreme forms of voter recall. The first assumes that a president's popularity level depends upon current levels of inflation and unemployment only while the second assumes that voters evaluate the president on the basis of his entire past performance in the current term. Regressions for the first model include various combinations of unemployment, anticpated inflation, unanticipated inflation, tax payments, and presidential intercept and slope dummies as dependent variables. For the regression including all of these

variables, the unemployment rate was significantly negative, both unanticipated and anticipated inflation have negative coefficients bordering on significance, and there is no serial correlation.

Michaels concludes that the second model which assumes voters are not forgetful is superior to the myopic model because more variables were significant, the Durbin-Watson statistics are acceptable, and the model produces generally higher adjusted R^2 terms. The most surprising finding to emerge from this analysis is the possibility that popularity suffers only if inflation is anticipated. Both models may be criticized for their lack of attention to the political aspects involved in popularity. He includes no variables designed to capture the effects of Vietnam, Watergate, or a honeymoon impact, all of which have been found significant in previous research.

Norpoth and Yantek (1983) and Monroe (1978, 1981) analyze the lag structures in the popularity function. Norpoth and Yantek utilize univariate Box-Jenkins ARIMA models to fit the lagged impact of unemployment and inflation on popularity. First differences of the series were taken from 1961:1-1980:12 with the difference between the popularity value of the last month of one administration and the first month of the next set equal to zero. When estimating for the entire time period, they fail to see any lag structure. The univariate ARIMA estimation of each

individual presidency shows a significant impact in a few cases but not a majority. Their model tends to downplay the impact of economic variables on the economy, but this may stem from the framework within which they have chosen to analyze the problem. They note (Norpoth and Yantek 1983, 801-802) some of the problems associated with applying Box-Jenkins models to the popularity series.

In two very similar papers, Monroe (1978, 1981) asserts that a lag structure in the presidential popularity function may be more adequately represented within an Almon lag model. Employing monthly data from 1950:1-1974:4, she examines the 24-month lagged effect of unemployment, inflation, real personal income, Standard and Poors Index, military expenditures, trade balance, and market interest rates on popularity, with the last two variables included in the later paper only. The basic conclusions of both papers are that Almon lag models are indeed superior to simple lag models and that while inflation and military expenditures significantly impact popularity all other variables, including unemployment, are insignificant.

Monroe's results may be criticized on several grounds. First, her results are not subjected to any rigorous significance tests. In addition, since the Almon lags extend back 24 periods, the model may implicitly assume that a current president may be held responsible for economic conditions created by his predecessors. Finally, as has

been the case with all the research reported in this section, Monroe's work cannot be seen as complete because it ignores political events and personality factors as determinants of presidential popularity.

1.3.4 Popularity Models Emphasizing Both Economic and Noneconomic Factors

The studies cited above emphasize the impact of time, political events, or the economy in isolation on popularity. While each has merit in its own right, a common flaw is that no popularity function may be seen as complete without including a combination of these variables. In the past several years Frey and Schneider (1978), Fair (1978), Golden and Poterba (1980), Chappell (1983), MacKuen (1983) and Chappell and Keech (1985ab) have attempted to develop a more holistic approach which includes economic as well as political measures in the popularity function.

Frey and Schneider (1978) and Golden and Poterba (1980) both examine the popularity function within the broader context of a politico-economic system which also includes a policy reaction function, though their conclusions with respect to the political business cycle are divergent. Frey and Schneider conclude that a political business cycle does exist, while Golden and Poterba cast doubt on the importance of the hypothesis as an explanation of macroeconomic policy. Since the popularity function is the issue of salience to

this thesis, only that portion of the two papers will be discussed here.

Frey and Schneider employ quarterly Gallup data from 1953:2-1975:2 to estimate a popularity function by OLS. Their regressors include measures for the popularity level of each president, a Watergate variable, and a Mueller-like coalition-of-minorities variable to measure popularity depreciation for each president. To model the impact of the economy, they include measures for lagged inflation, unemployment, and growth in consumption, though one of the variables is alternatively dropped to reduce the effects of multicollinearity. After correcting for serial correlation, they find that both inflation and unemployment significantly affect popularity. Thus, they conclude that Mueller's (1970) specification of the popularity function which includes only unemployment in the regression equation is incorrect.

The popularity function estimated by Golden and Poterba using Gallup poll data from 1953:2-1978:4 is similar to that formulated by Frey and Schneider. As political measures, they include a variable measuring the number of quarters since the President took office to reflect a "honeymoon" effect or a "coalition of minorities" effect suggested by Mueller and a binary Watergate variable from 1973:2-1974:2. In addition, binary presidential dummy variables were

including to capture "personality" effects of each president.

Six lagged values of inflation, present and three lagged values of unemployment, and the lagged change in real disposable income are included as measures of the economy. Although the inclusion of lagged economic terms allows the public to be less myopic in their evaluation of the President, including lagged values in this manner implicitly credits a current administration with the inflation or unemployment rates existing in a previous administration. In a procedure similar to that followed by Frey and Schneider, one economic variable is dropped in turn to help reduce multicollinearity. The original OLS estimates showed presence of serial correlation so correction was made through the use of the Cochrane-Orcutt procedure. Their results show that while inflation significantly influences popularity, unemployment does not.

Fair (1978) employs a model far different from any described heretofore. Rather than analyzing the levels of popularity throughout the administration, he is interested in actual votes in presidential elections. His purpose is to provide a general model within which many of the theories of voting behavior may be examined and then to use this model to analyze the effect of the economy on votes for President. Rather than utilizing Gallup poll data, he uses as his dependent variable the percentage voting for a

Democrat in presidential elections from 1916-1976, a total of only 16 observations. Using the unemployment rate, real GNP per capita, and the GNP deflator, he creates 16 economic measures including levels, rates of change, and rates of change over extended periods. In some equations only one variable is included while in others two variables are employed. A time trend, a measure of each candidate's independent vote-getting ability, and a variable designed to see if an incumbant has an advantage in running for reelection are also included in the nonlinear estimation of the popularity function.

Fair finds that the change in real GNP or the change in unemployment significantly affect votes for president but that other measures do not. In addition, voters are found to have a very high discount rate, indicating that they are extremely myopic. They do not consider the past performance of a nonincumbant party and only consider the events within the year of the election for the incumbant party.

Though Fair includes many statistical tests of his model, it is difficult to make strong conclusions from a data set which includes only 16 observtations. In addition, it is somewhat disconcerting that the largest errors occur in the last two elections.

Chappell (1983) and Chappell and Keech (1985a) develop a unique model for explaining presidential approval which assumes that the voter is "sophisticated" in that he knows

both the short run and long run outcomes of policies and is concerned with the future as well as with current and past economic performance. The voter is aware of optimal monetary and fiscal policy and punishes the incumbant for deviations from that optimal policy. The popularity function becomes quite complicated: it includes a loss function to account for the deviation from optimal policy, honeymoon variables for the first six quarters, a variable reflecting the number killed in each quarter in Vietnam, a Watergate variable, and dummy variables for each president. In addition, in Chappell and Keech (1985a) the economic variables are weighted by (1) a dummy assuring that performance of the previous administration does not reflect in the evaluation of the current administration and (2) a variable reflecting the increasing importance attached to average performance as time in office accumulates.

The models are estimated using nonlinear least squares and are corrected for serial correlation. Comparison is made with "naive" models in which inflation and unemployment are included linearly. In Chappell and Keech (1985a) regressions are included for both aggregate popularity and for disaggregated portions of society. Their research supports the sophisticated model as the results for the naive model were consistently weaker.

MacKuen (1983) compares the public's responsiveness to changing economic conditions with responsiveness to dramatic

political events from 1963-1980. He finds that the two have equal influence on popularity. With respect to economic conditions, he finds that unemployment has a larger immediate impact on popularity than inflation, but its impact is not long felt. When the "persistence of the impact" is examined, he finds that inflation is considerably more important.

Smyth and Dua (1988, 1989) note that while theoretical analyses establish that the social indifference map between inflation and unemployment derived from the presidential popularity function is concave to the origin, empirical research has failed to estimate the popularity function in a manner consistent with this assertion.[9] Employing monthly economic approval data from February of 1982 to November of 1986 described in Section 1.3.1, they (1988a) regress the popularity measure on inflation and unemployment lagged and a lagged dependent variable. As such, this excludes the honeymoon period and ends before the Iran-Contra scandal, thus eliminating the need for dummy variables. They employ a Box-Cox transformation to estimate the nonlinear

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[9]Lepper (1974) derives a nonlinear "constant vote curve" assuming satisficing behavior on the part of individuals. When empirically estimating a popularity function, however, she allows inflation and unemployment to enter the voting function linearly. Keech (1980) recognizes the nonlinear relationship between inflation and unemployment in a review paper outlining the effects of electoral politics on economic policy-making. Like Lepper, however, his later empirical works with Chappell (1985ab) do not reflect this knowledge as the economic variables enter the popularity function linearly.

relationship since it does not impose rigid restrictions on the form of the public's utility function. With all variables statistically significant and with no indication of serially correlated errors, their research finds the nonlinear model superior to a linear one.

In (1989), Smyth and Dua again employ the Michigan Survey data but in quarterly form from 1971:2 to 1986:4. The nonlinear relationship is estimated by regressing approval rating on unemployment, unemployment squared, and inflation via ordinary least squares. They also include a honeymoon effect and a dummy variable for Watergate which takes the value of 1 for 1973:1 to 1975:1. Finally, to test the belief that President Reagan is fundamentally more popular than either Nixon, Ford, or Carter, they include a variable N which takes the value of 0 for observations in the Reagan administration and 1 for observations in either of the other administrations. All variables were statistically significant and serial correlation was not present.

Maloney and Smirlock (1981) also estimate the social preference function as concave to the origin. By totally differentiating a quadratic popularity function (inflation and unemployment included in squared form), they estimate the following:

$$dV_t = \alpha P_t dP_t + \beta U_t dU_t + d\Omega_t$$

where V_t is popularity, P_t is inflation in time t and U_t is the unemployment rate. Ω_t contains three binary dummy variables chosen to explain large residuals when the regression is run including only the economic variables. They estimate the model from using Gallup data from 1975:1 to 1976:4 and find all variables to be statistically significant. Our attempts to replicate Maloney and Smirlock's results, however, have been fruitless. Even when modifying their stated pattern somewhat we have been unable to achieve significant coefficients for either economic variable.

1.4 Summary

The research presented within this chapter is quite varied in the approaches taken in estimating presidential popularity. The choice of economic and noneconomic variables included in the popularity function varies widely as do the empirical techniques employed. As noted earlier, Appendix I presents the differences of the major works in tabular form. Though broad generalizations are difficult, there are several statements which may be made regarding the state of the current research.

(1) Though the vast majority of research has employed Gallup Poll data, none of this work has extended the analysis past the Carter administration. Smyth and Dua

(1988, 1989) have examined the Reagan administration using Michigan Survey economic approval data, but no published research has appeared employing Gallup data for the Reagan years. Monthly Gallup data through December of 1988 is now available and should be incorporated into current research efforts.

(2) The theoretical literature clearly indicates that the social indifference map between inflation and unemployment is concave to the origin. With few exceptions, however, empirical researchers have failed to estimate the presidential popularity function in such a manner as to yield these nonlinear curves.

(3) Empirical analyses of the public's social preference function typically estimate the function over several presidential administrations, thus assuming that no structural change in the economic variables occurs over time. While several researchers allow for shifts in the intercept through presidential dummies, most do not allow for changes in the slope of the preference function. Those which estimate each administration individually do not justify this action with rigorous stability tests.

(4) The political business cycle models of Nordhaus (1975), MacRae (1977), Tufte (1978) and Barro and Gordon (1983) assume that a president attempts to maximize a popularity function subject to the constraint of the short-run Phillips curve by reducing unemployment and raising the

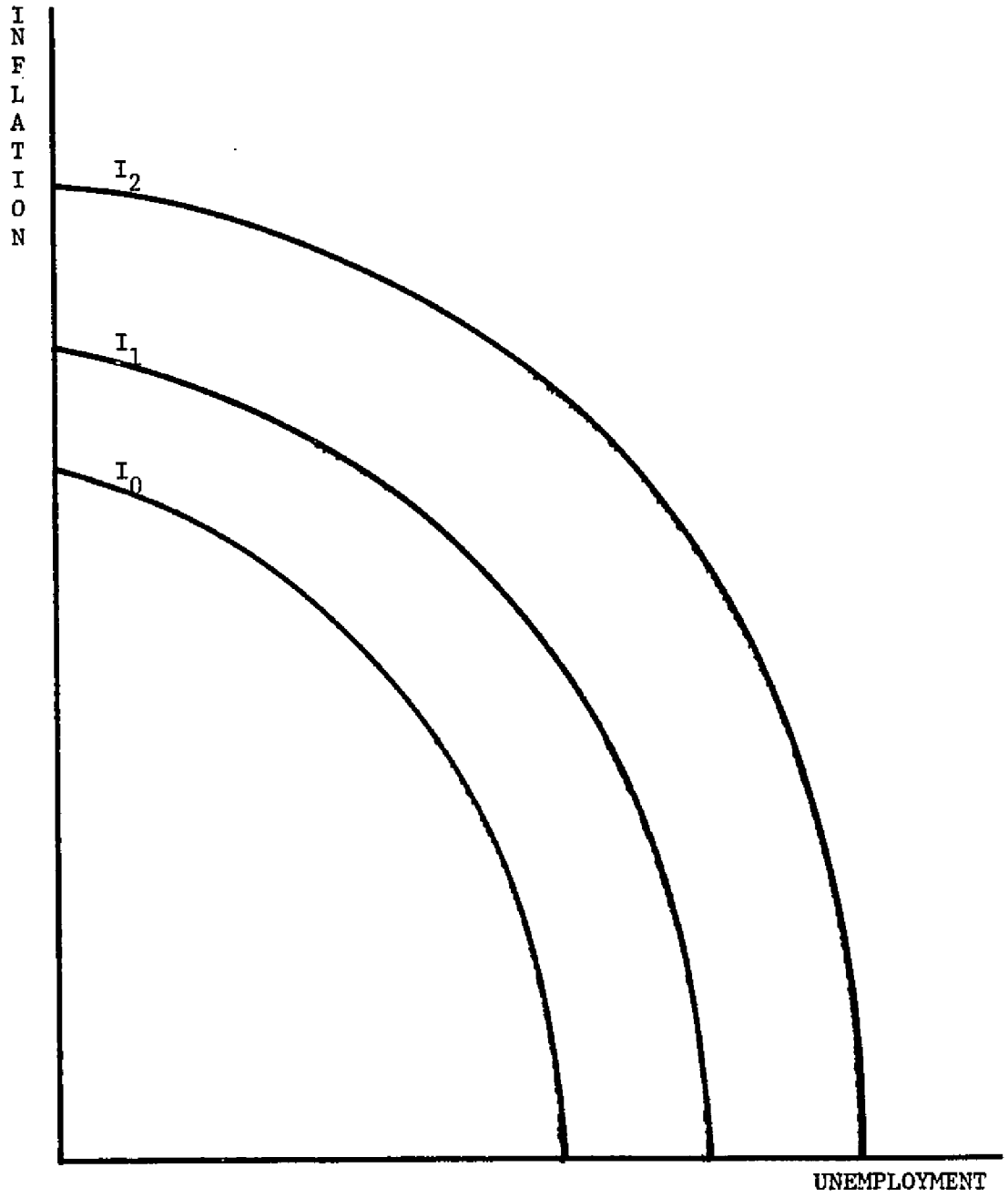
inflation rate. After the election as inflation expectations are revised upward, the inflation rate rises and popularity falls.

While Frey and Schneider (1978) and Golden and Poterba (1980) among others have sought to determine if such a pattern is to be observed over an election cycle, there is no empirical evidence directed to the question as to whether or not there are really any worthwhile gains to be obtained from an administration creating a political business cycle.

The following chapters of this thesis will seek to address these deficiencies in the current literature. Gallup Poll data on presidential popularity will be employed from the Eisenhower to the Reagan administrations. The presidential popularity function will be estimated in such a manner as to generate a social indifference map which is concave to the origin. Within a sets of equations framework the thesis will present empirical support for the hypothesis that structural shifts in the coefficients of the economic variables of the social preference function do occur over time, indicating that separate preference functions should be estimated for each administration. The thesis will examine the gains in terms of increased popularity to be accrued from creating a political business cycle by exploiting an expectations augmented short-run Phillips curve. Finally, popularity functions disaggregated by race,

sex, political party, and geographical region will be estimated and compared.

Figure 1.1
Social Preference Curves



CHAPTER 2

Structural Change in the Presidential Popularity Function

As the review of the current literature in Chapter 1 indicates, most empirical analyses of presidential popularity estimate the function across several regimes. In doing so, they implicitly assume that the public's preferences toward inflation and unemployment remain constant over time. It is quite possible, however, that there has been a shift in the public's perceptions over time such that inflation rates or unemployment rates which were once considered a political liability would now be considered moderate. In addition, the public may hold different presidents responsible to a differing degree for the state of the economy due to differing campaign promises, extent of cooperation from Congress and the Federal Reserve and other factors. Therefore, this chapter explores a model of structural change in which all coefficients are allowed to vary for each administration.

Section 2.1 presents a description of the data to be used in this empirical investigation. Section 2.2 includes the initial model which estimates the popularity function over the entire time period. Several widely used tests for structural change are discussed in Section 2.3. The sets of equations model for structural change is presented in Section 2.4 as well as the results of this test. Conclusions to Chapter 2 are given in Section 2.5.

2.1 The Data

The following variables are used in our analysis of presidential popularity:

Y = presidential popularity;

Y_{-1} = presidential popularity lagged one month;

P = inflation rate;

U = unemployment rate;

Honey = dummy trend variable representing a president's initial honeymoon period with the public;

Killed = number killed per month in the Vietnam conflict;

Water = dummy variable representing the Watergate scandal;

Iran = dummy variable reflecting the Iran-Contra affair;

D_i = binary dummy variable for each president to capture personality influences on popularity;

ϵ = disturbance term;

The presidential popularity data employed as the dependent variable is the percentage who responded "approve" to the Gallup Poll question "Do you approve or disapprove of the way Mr. _____ is handling the job of President?" We utilize monthly data from 1953:2 to 1988:11. When more than one poll was undertaken in any month, we take the average of the polls during that month. Upon several occasions there were no approval ratings provided. If only one observation

is missing, we take an average of the values immediately preceding and following the missing point. However, if two or more consecutive data points are missing, we feel interpolation is inappropriate and thus leave a gap in the data.[1] We also delete the observation for December 1988, President Reagan's last full month in office. We feel the sharp increase in the approval rating for that month, 63% in December up from 57% in November, reflects a benevolent or sentimental farewell to a fairly popular president rather than any real economic improvement.[2]

Since the model is estimated using monthly data, we include a lagged dependent variable, Y_{-1}, as a regressor. This allows popularity to adjust to changes in inflation and unemployment with a partial adjustment process. Due to the use of this lagged dependent variable, we reserve the first observation of each new presidency for the lag.

The inflation rate, P, is the inflation rate over the past twelve months calculated from the consumer price index, all urban consumers, all items, expressed as a percentage. The unemployment measure, U, is the percentage of unemployed civilian workers 16 years and older, seasonally adjusted.

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[1]No interpolations are made for the following dates: 1955:9-1955:10, 1956:9-1956:10, 1963:12, 1964:7-1964:10, 1968:12, 1972:7-1972:10, 1976:7-1976:11, and 1987:9-1987:11. Gaps are left for these time periods.

[2]We feel this deletion is justified. When we forecasted the 1988:12 value from our existing model and the predicted value was 53.5, significantly smaller than the actual value.

Both P and U are lagged one month to represent the most recent inflation and unemployment information known to the public. The indifference map between inflation and unemployment is found by solving the popularity function for inflation at a constant popularity rating. In order to cause the resulting indifference map to be concave to the origin, we include both of the economic variables as squared terms and estimate the social preference function as a quadratic.

Table 2.1 presents the maximum and minimum inflation and unemployment rates experienced by each administration as well as the maximum and minimum popularity ratings. Figures 2.1-2.5 reinforce this information by presenting the path of popularity for over time for Eisenhower, Kennedy-Johnson, Nixon-Ford, Carter and Reagan, respectively. Eisenhower's popularity at its highest reached 79% and never fell below 49%. The highest popularity rating granted Kennedy-Johnson, 80.5%, came at the beginning of the Kennedy administration and the lowest rating, 35.0% came just prior to the end of Johnson's term. The highest approval rating attained during the Nixon-Ford terms was 67% and the lowest was 24% just before Nixon's resignation. Carter's popularity was extremely high early in his administration, but his lowest rating, 27%, came shortly before his bid for reelection. Note that this low rating coincided with the highest unemployment rate attained during the administration.

Though Reagan has been considered somewhat of an enigma in his ability to maintain consistently high popularity ratings, his popularity figures are surprisingly similar to his Republican precedessors and were lower than the extreme figures cited for Eisenhower. It is again of interest to note that Reagan's lowest popularity rating was granted when unemployment was at its highest level during the entire administration; his rating was 36.7% when unemployment reached its highest level of 10.8% in December of 1982 and January of 1983. Even in the midst of the Iran-Contra affair Reagan's popularity never fell below 40%.

The model includes several non-economic variables designed to capture other influences on popularity. A honeymoon variable, Honey, is included to reflect that the public understands that the economic conditions which persist during the first few months of an administration are not attributable, either positively or negatively, to the new president's economic policies. The honeymoon variable for Eisenhower, Kennedy, Nixon, Carter and Reagan takes the value of 11 in the second month of an administration's tenure, declining to 1 at the end of the first year and then taking the value of 0 thereafter.[a]

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[a]Several other formulations of the honeymoon variable are explored in Chapter 3. The formulation presented here is found to be at least as good as or superior to the other specifications.

The variable Killed represents the number of Americans killed in action per month during the Vietnam Conflict spanning 1965:1-1968:12.[4] The negative impact of the Watergate scandal on the Nixon administration is captured by the dummy variable Water which takes a value of 1 from 1973:4-1974:7, a value of .5 in 1974:8 since Nixon's resignation came early in that month, and a value of 0 otherwise. The dummy variable Iran reflects the impact of the Iran-Contra affair on the Reagan administration and takes the value of 1 from 1986:12-1987:11 and 0 otherwise.[5] Finally, following Mueller (1970), Golden and Poterba (1980), Chappell (1983), Chappell and Keech (1985) and others, a dummy variable for each administration, D_i, is included to capture elements of popularity singular to each president.

Certainly there are many other noneconomic factors which influence presidential popularity such as domestic

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[4]Vietnam casualty figures are gleaned from Milstein (1974). The casualty figures are available through September of 1970. Preliminary research indicates that the Killed variable is far from significant for the Nixon-Ford administration, however, so we ended the series with 1968:12, the end of the Kennedy-Johnson administration. MacKuen (1983, 173) also includes a Vietnam variable for the Kennedy-Johnson time period only, arguing that "Nixon's reduction of the war effort...was not translated into approval, and given the politics of the period, this is not surprising."

[5]We experimented with other formulations of each of these dummy variables in preliminary research and found those presented here to be clearly superior. The results of this sensitivity analysis are to be found in Chapter 3.

unrest and handling of other international events. Unfortunately, these factors are quite difficult to quantify in a meaningful manner for empirical use. In order to keep the model as simple as possible, we choose to limit the dummy variables to those capturing the major political events described above. The effect of other noneconomic factors will be seen in the error term. The high adjusted R^2 terms reported in the work which follows and the lack of serial correlation cause us to feel that the model is well specified.

2.2 The Initial Model

As mentioned in the preceding section, we include both of the economic variables as squared terms in order to allow the indifference map to be concave to the origin and estimate the social preference function as a quadratic of the following form:

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 \text{Honey} + \beta_3 P^e + \beta_4 U^2 + \beta_5 \text{Killed} + \beta_6 \text{Water} + \beta_7 \text{Iran} + \sum_{i=1}^{7} \alpha_i D_i + \epsilon \quad (2.1)$$

The model is estimated using ordinary least squares (OLS) in Time Series Processor (TSP). A possible objection to the use of OLS is that the dependent variable is constrained to lie between zero, all respondents disapproving or having no opinion of the president's

performance, and a maximum of 100, with all respondents approving of the president's performance. This may potentially result in predictions which lie outside the theoretical interval. Indeed it is a possible problem not only here but in all the studies using presidential popularity data cited in Chapter 1. Smyth and Dua (1988b), Michaels (1986, n. 6), MacKuen (1983, n. 6) and Mueller (1979, n.10) recognize this problem as well. They suggest the alternative use of a probit model which would constrain the dependent variable to lie within the (0,100) interval. Since popularity never fell below 24% or went above 80% and since the values predicted by the model all lie in the 0 to 100 range, we feel there is no real constraint which would make OLS estimation inappropriate.

The results of the OLS estimation are presented in Table 2.2. In addition to the estimated parameters, we report the t-statistics in parentheses, the R^e adjusted for degrees of freedom, the standard error of the regression, and the Durbin h-statistic. The Reagan administration is used as the base for the model. With the exception of several of the presidential dummies, all of the estimated coefficients are statistically significant at the 95% confidence level. The Durbin h-statistic is not significant

indicating that there is no evidence of serial correlation of the residuals.[6]

With the exception that it includes the economic variables in their squared form, this model is quite similar to many presented in the literature. It would be tempting to conclude from this analysis that the model works for all presidencies with the inclusion of presidential intercept dummies. However, this model implicitly assumes that the public's perceptions toward inflation and unemployment have remained constant over time when this may not have been so. Perceptions toward both inflation and unemployment have changed over time. Additionally, the public may hold presidents responsible to a differing degree for the state of the economy due to differences in campaign promises, party affiliations, and cooperation from the Federal Reserve and Congress. The following sections present several rigorous tests of the hypothesis that responses to inflation and unemployment by the public differ by administration.

2.3 Tests for Structural Change

[6]In computing the Durbin-Watson d-statistic, TSP automatically adjusts for gaps in the data. Since this h-statistic is calculated from the d-statistic reported by TSP, it is also properly adjusted for gaps. The Durbin h and d statistics only check for the presence of first-order serial correlation. By computing the Durbin m-statistic, however, one may check for higher order correlation. When we conducted this test to check for up to fourth-order correlation, none was present.

There are several methods for testing for structural change presented in the literature. This section examines three of them: the Chow test, the Brown-Durbin-Evans Cusum Squares, and a dummy variable model as presented by Gujaradi.

2.3.1 The Chow Test

Perhaps the most widely used method of testing for differences between two regressions is the Chow (1960) test. In implementing the Chow test, two separate regressions are run allowing the parameters to differ between the two time-periods. An unconstrained sum of squared errors (SSE) is formed by summing the SSEs from the two separate regressions. A third regression is run on all the data (from both time periods) constraining the parameters to be the same in both periods. This regression yields a constrained SSE. An F-statistic is then formed as follows:

$$\frac{[SSE(\text{constrained}) - SSE(\text{unconstrained})]/K}{SSE(\text{unconstrained})/(T_1 + T_2 - 2K)} \sim F_{K,\ n+m-2K} \qquad (2.2)$$

where K is the number of parameters, T_1 is the number of observations in the first period and T_2 is the number of observations in the second period. The null hypothesis for this test is that the regressors in both equations are equal. The test as described above is designed for testing

the equality of regressors in two subgroups. It may be extended to more than two equations without difficulty.[7]

A major drawback of the Chow test is that it is not easily applicable to a test of equality of only some but not all regression coefficients. The Chow test does not indicate specifically which coefficient, intercept or slope, is different or whether both are different in the two (or more) subgroups. In addition, in order to apply the Chow test the regressors in both subgroups must be the same. Since one objective of this chapter is to indicate structural change in the economic variables and since there are noneconomic factors specific to several of the administrations, the use of the Chow test in examining structural change in the presidential popularity function is inappropriate.

2.3.2 The Brown-Durbin-Evans Cusum Test

The Brown Durbin Evans (1975) test is a more complex test for structural stability which relies on a graphical technique for determining departures from constancy. It relies upon plots of cumulative sums and sums of squares of recursive residuals to indicate stability.

Consider the basic model

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[7] For more information on the Chow Test see Kennedy (1985) and Kmenta (1986).

$$Y_t = X_t\beta_t + u_t \qquad (2.3)$$

where Y_t is a vector of the dependent variable, X_t is a matrix of regressors, β_t a vector of coefficients and u_t an error vector assumed to be independent and normally distributed with with mean zero and variances σ_t^2, t = 1,...,T. The null hypothesis of constancy over time is then given by

$$\beta_1 = \beta_2 = \ldots = \beta_T = \beta \qquad (2.4)$$
$$\sigma_1^2 = \sigma_2^2 = \ldots = \sigma_T^2 = \sigma^2$$

Brown-Durbin-Evans indicate that it seems natural to examine OLS residuals, but that these residuals are not sensitive to small or gradual changes in βs. They suggest the use of cumulative sum, or cusum, techniques, but even these are difficult to work with in their unstandardized form. As a result, they advocate the use of recursive residuals which allow one to look at the problem in terms of standardized cusums and cusums of squares of independent $N(0, \sigma^2)$ variables.

According to Kennedy (1985, 74), "The nth recursive residual is the error in predicting the nth observation using parameters estimated from a linear regression employing the first n-1 observations." Brown-Durbin-Evans show that if β_t is constant until time t=0 and differs from

this value from then on, the recursive residual (w_r) will have zero means until time t_o but nonzero means after that.

The test for structural change involves calculating the cusum of the recursive residuals, plotting them against time and determining if the path of the cusum of the recursive residuals deviates from its mean. A pair of lines symmetrically above and below the mean value are drawn such that the probability of crossing one or both of the lines is α, the required significance level. If the plotted cusum quantity remains within the significance boundaries, the null hypothesis of no structural change cannot be rejected. If, however, the plotted cusum crosses the boundaries, a structural break is determined to occur at that point.[8]

A merit of employing the Brown-Durbin-Evans test is that the plot of the recursive residuals allows the researcher to determine the exact point of structural break if this information is not known a priori. Thus, the use of this test would not require that we impose a structural break at the beginning of each new administration. The test would indicate the appropriate point or points of the break.

There are, however, two major drawbacks from employing the Brown, Durbin, Evans test in the current situation. First, the computer package available to us for conducting

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[8]See Brown-Durbin-Evans (1975) for further information on the calculation of significance levels and interpretation of the plotted cusum quantity. They also give details of a cusum squared test which complements the one presented here.

the test, D-FIT, does not accommodate binary dummy variables in the Brown, Durbin, Evans test. Second, as with the Chow test, it is impossible from the test to determine the source of the structural shift. Whether the break is caused from intercept or slope factors cannot be ascertained from this test. Once again, since determining the source of structural change is the major objective of this chapter, the Brown Durbin Evans test doesn't provide the information we seek.

2.3.3 The Dummy Variable Approach

2.3.3a The Basic Dummy Variable Model

Gujaradi (1970ab) presents a dummy variable approach to the structural change question.[9] If we assume two time periods and only one regressor, the observations are pooled together and the following equation is estimated:

$$Y_i = \alpha_1 + \alpha_2 D_i + \beta_1 X_i + \beta_2 (D_i X_i) + u_i \qquad (2.5)$$

where Y_i and X_i are the dependent variable and regressor respectively and where $D_i = 1$ for observations in the first period and zero for observations in the second period.

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[9]This model is also referred to as the multiple interrupted time series (MITS) model. There are many examples of its use, two of which are Garand and Gross (1984) and Garand (1985).

In the above equation, Gujaradi refers to α_2 as the differential intercept and β_2 as the differential slope coefficient. These values indicate how much the intercept and slope coefficients, respectively, of the first period differs from the intercept and slope coefficient of the second period. If the differential intercept term is significant, structural change may be attributed to the intercept term only. If the differential slope coefficient is statistically significant, then the structural change may be attributed to changes in the slope factors.

If both the slope and intercept dummy variables are statistically significant, then the original equation may be rewritten as two regressions:

$$\text{First Period: } Y_i = (\alpha_1 + \alpha_2) + (\beta_1 + \beta_2)X_i \qquad (2.6)$$

$$\text{Second Period: } Y_i = \alpha_1 + \beta_1 X_i$$

The dummy variable model avoids several of the difficulties encountered with the Chow test and the Brown-Durbin-Evans test. One regression may be used to test several hypotheses: if slopes are equal, if intercepts are equal, or if the entire regression is stable over time. It tells not only if the two regressions are different but also indicates the source of the difference. The dummy variable approach suffers in that it assumes the researcher knows a

<u>priori</u> the time period when the structural change takes place.

The dummy variable model as presented by Gujaradi may be extended to include several subgroups. In the model modified to accommodate more than two groups, however, the interpretation of the results is somewhat different. One period is chosen as a "base" and the estimated coefficients for the other periods are tested for significant difference from the base time period. For the purpose of this analysis, the Reagan administration serves as the base time period.

2.3.3b Empirical Results of the Basic Dummy Variable Model

Implementing the dummy variable approach is fairly straightforward. Within the context of the presidential popularity model, we estimate the following:

$$Y = \alpha_0 + \Sigma_1^7 \alpha D_i + \beta_0 Y_{-1} + \Sigma_1^7 \beta (D_i Y_{-1}) + \tau_0 \text{Honey} + \quad (2.7)$$
$$\Sigma_1^7 \tau_i (D_i \text{Honey}) + \theta_0 P^2 + \Sigma_1^7 \theta_i (D_i P^2) + \Phi_0 U^2 +$$
$$\Sigma_1^7 \Phi_i (D_i U^2) + \delta_1 \text{Killed} + \delta_2 \text{Water} + \delta_3 \text{Iran}$$

All variables are defined as in the initial model. The coefficients to be estimated in the model are α_i, β_i, τ_i, θ_i, Φ_i, and δ_i. Table 2.3 presents the results of this estimations technique applied to the presidential popularity function. We will reserve for future discussion the implications for each presidential regime of the estimates

and examine only the question of structural change since this is our current focus.

Each of the "base" variables are statistically significant and of the expected sign. Since the Reagan period is used as the base for this analysis, all base coefficients refer to his regime. The t-statistic of each "differential" variable indicates whether the coefficient is statistically different from the corresponding "base" coefficient. Thus, the t-statistic of the Eisenhower dummy for inflation squared indicates that the public punished Eisenhower significantly more severely for increases in inflation than it did Reagan. However, a significant dummy variable t-statistic does not imply that inflation, for example, plays a significant role in determining the popularity of the individual president. This is the case for the Carter administration: the inflation squared term is significantly different from that for Reagan but results to be reported later indicate that this economic variable is not statistically significant with respect to its effect on Carter's popularity.

As we examine the differential variables for the intercept term, we see that Kennedy-Johnson and Carter intercepts are significantly lower than Reagan's and that the Eisenhower intercept is marginally lower. This is the case for the adjustment process as well. When examining the economic variables, we see that the inflationary effect is

significantly different from Reagan's for Eisenhower and Carter while the unemployment variable is significantly different for Kennedy-Johnson and Nixon-Ford.

From this analysis, we conclude that when using Reagan as a base there has indeed been a structural break in the economic slope coefficients as well as in the intercept coefficients. Thus, estimating the popularity function over the entire period without including slope dummies as has been done in most previous research is improper.

The dummy variable approach to testing for structural change is not entirely satisfactory when applied to our presidential popularity model for several reasons. First, while the t-statistics of the dummy terms indicate if the differential term significantly differs from the base terms, they do not indicate if the variable has a significant impact on its relevant presidential administration.

Second, this approach allows us to test single hypotheses only. For example, we may test if the Eisenhower inflation term differs from Reagan's or if that for Nixon-Ford differs from that for Reagan and we will make us of this pairwise test later. It will not, however, allow us to test the joint hypothesis that Eisenhower's inflation term differs from Nixon-Ford's which differs from Reagan's. These joint tests are of importance to us and thus we turn to a sets of equations framework to implement them.

2.4 Sets of Equations Model

The fourth test for stability follows loosely a presentation by Judge, et. al. (1988, 428-430) and is conceptually quite similar to the dummy variable model. We give it special attention because it addresses the two major problems associated with the dummy variable approach: it allows joint tests for stability rather than individual tests only and it creates a t-statistic for the significance of each variable with respect to its specific administration. Section 2.4.1 describes the basic sets of equations model and Section 2.4.2 presents the empirical results.

2.4.1 A Theoretical Discussion of the Sets of Equations Model

To utilize the sets of equations model, the data is first partitioned into two subgroups, one pre-change and the other post-change.[19] Stacked vectors and a block matrix are then formed as follows:

$$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} X_1 & 0 \\ 0 & X_2 \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \end{bmatrix} \qquad (2.8)$$

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[19]For simplicity of presentation, we have limited ourselves to two subgroups, though the model can be expanded to include any number. In the empirical work to follow, for example, we use as many as seven subgroups, one for each presidential administration.

$$y = X\beta + \epsilon \qquad (2.9)$$

y is a stacked vector of the dependent variable where y_1 refers to the first subgroup and y_2 to the second. X is a block matrix containing the regressors relevant to each subgroup. A pleasing feature of this model is that the regressors in X_1 and X_2 may include the same variables but they are by no means restricted to do so as with the Chow test. β is a vector containing the coefficients for the X matrix such that $\beta' = [\beta_{11} \quad \beta_{12} \ldots \beta_{1k}]$ where k is the number of regressors relevant to the subgroup; ϵ_1 is the error term for the corresponding subgroup.

By applying ordinary least squares (OLS) to the above system, we obtain estimators for the stacked parameter vector β:

$$\mathbf{b} = \begin{bmatrix} \mathbf{b_1} \\ \mathbf{b_2} \end{bmatrix} = \begin{bmatrix} (X_1'X_1)^{-1}X_1'y_1 \\ (X_2'X_2)^{-1}X_2'y_2 \end{bmatrix} \qquad (2.10)$$

Estimating the model in this sets of equations format allows us to obtain results equivalent to those obtained by estimating each subgroup individually. This is not entirely equivalent to estimating separate regressions for each subgroup, however. As Judge, et. al. (1988, 430) have pointed out, while two separate regressions would produce identical parameter estimates, two different estimates of

the error variance would be generated rather than one as obtained from this model.

The major drawback to implementing the sets of equations model is that the researcher must make an a priori decision as to where the structural change occurs or come to such a conclusion in an ad hoc manner. The model provides no guidance for choosing the point(s) in time where the shift takes place as is the case with the Brown Durbin Evans test.

The sets of equations model is attractive, however, for a variety of reasons. First, it is extremely straightford to implement and easy to interpret. Second, as noted previously, the subgroups may include the same regressors, but they are not restricted to do so. This addresses the major drawback in using the Chow test. In addition, the inclusion of numerous dummy variables does not pose computational problems as with the Brown Durbin Evans test. Third, we may derive t-statistics for the significance of each coefficient to its specific administration, an improvement over the dummy variable model. Finally, a major benefit for our purposes is that by means of an F-test we may determine whether structural changes have occurred in the intercept term, the slope coefficients, or both.

2.4.2 Empirical Results of the Sets of Equations Model

When applying the sets of equations model to an analysis of presidential popularity, we initially divide the data into seven groups, one for each of the administrations. The regressor matrix for each subgroup includes a constant, lagged dependent variable, inflation squared and unemployment squared. All administrations with the exception of Johnson and Ford include a honeymoon variable. The honeymoon variable is excluded for these two administratons because preliminary research indicates that the honeymoon period for them was either extremely short or nonexistent. Additionally, the submatrix for Johnson includes the Killed variable, that for Nixon includes the Watergate variable and that for Reagan includes the Iran variable. All variables are defined as in the preceding sections.

This sets of equations model is estimated by ordinary least squares.[11] The results are presented in Table 2.4 with t-statistics in parentheses. The reported R^2 adjusted for degrees of freedom indicates that 92 percent of the variance in the residuals is accounted for by the model.

Table 2.4 also reports the Durbin m-statistic. Due to computational problems encountered when employing a lagged dependent variable in the block matrix format we chose not

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[11]We employed Proc Matrix in SAS to generate the OLS results.

to employ the Durbin h-test for serial correlation typically employed when a lagged dependent variable is used but rather we report the results of the Durbin m-test. The Durbin m-test consists of regressing the least squares residuals on all variables in the original regression in addition to the residual lagged one period and testing the significance of the estimated coefficient of ϵ_{-1} by a standard t-test. If the t-test indicates that ϵ_{-1} is not significantly different from zero then we conclude that no serial correlation is present. For ease in presentation, we refer to the t-value of ϵ_{-1} as the "m-statistic."[18] Since this m-statistic is not statistically significant we are satisfied that there is no serial correlation in the residuals.

A discussion of the estimated coefficients will be reserved for Chapter 3. Currently, we use these estimates to conduct a series of F-tests to determine whether the estimation of the presidential popularity function should span the entire time period or each administration separately. The results of the various tests are presented in Table 2.5, Column 1. Test 1 tests the joint hypothesis that all common variables in the seven regimes are equal: that all intercepts are equal, that all adjustment processes

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[18]For more information on the m-test see Kmenta (1986). Maddala and Rao (1973) find no substantial differences between the m-test and the h-test. Spencer (1975) presents evidence in favor of the m-test. Due to the use of the lagged residual, we drop the first value of each administration when applying the m-test.

are equal, and that inflation terms across regimes and unemployment terms across regimes are equal. The calculated F-statistic is presented with degrees of freedom in parentheses beneath it. The F-statistic indicates that we may reject at the 99% confidence level the null hypothesis that all common values are equal.

The rejection of this joint null hypothesis could be caused by the rejection of any of the individual hypotheses comprising the joint hypothesis. If, for instance, the intercepts of each administration are not equal but all other common variables are equal, then the model implicit in most previous work which estimates the function over the entire time period and includes intercept dummy variables would be appropriate. If, however, the economic variables are not equal then the slopes for the various regimes would be different and the sets of equations model presented here is appropriate. Thus, we undertake further tests for equality of variables across regimes.

Test 2 compares only the intercepts of each administration. The F-statistic indicates that we may reject the null hypothesis that the intercept values are equal. Test 3 conducts an F-test comparing the adjustment processes, the coefficients of Y_{-1}, over the administrations. Again, the F-statistic allows us to reject the null hypothesis that the adjustment processes are equal.

Test 4 is a joint F-test with the null hypothesis that the inflation terms across regimes and unemployment terms across regimes are equal. Once more, the F-statistic causes us to reject the hypothesis that the slope variables across regimes are equal. We refine this hypothesis still further by examining the null hypothesis that the inflation terms are equal across administrations in Test 5 and that the unemployment terms across regimes are equal in Test 6. Both of these tests allow us to reject the null hypothesis that the variables are equal. These results lead us to the conclusion that the economic impact on popularity varies from administration to administration and thus that the presidential popularity functions should be estimated either for each administration or jointly for the entire time period in a way which allows all the coefficients to vary. It is clear that just including regime dummies is not satisfactory.

Chappell (1983) estimates the popularity function for the Kennedy-Johnson and Nixon-Ford administrations jointly. He argues that the economic policies followed by both Johnson and Ford differed only slightly from those initiated by their predecessors. In addition, the Ford administration is so short that it allows only a very limited number of degrees of freedom. Within the sets of equations model estimated above and presented in Table 2.4 tests of structural change between the Kennedy and Johnson

administrations and the Nixon and Ford administrations may be conducted. Upon examining Columns 2 of Table 2.5, the only test which may be rejected at the 95 percent confidence level for the Kennedy-Johnson administrations is Test 6, that the unemployment terms across the two administrations are equal. This is not surprising given that the Johnson unemployment term is positive rather than negative and that it is statistically significant as well. Upon examining the results for the Nixon vs. Ford administrations in Column 3 of Table 2.5, we see that the once more the only test which may be rejected at the 95 percent confidence level is Test 6, that the unemployment terms are equal. Since in both cases the joint hypothesis that both economic variables are equal (Test 4) and the joint hypothesis that all common variables are equal (Test 1) cannot be rejected at the 95 percent confidence level, we may conclude that estimating the Kennedy-Johnson and Nixon-Ford administrations jointly rather than separately is acceptable.

2.4.3 Extensions of the Sets of Equations Model

The tests in the preceding paragraphs indicate that the Kennedy-Johnson and Nixon-Ford administrations may be estimated jointly because the evidence of structural change between them is weak. As such, we re-estimate our sets of equations model employing only five subgroups: one each for Eisenhower, Kennedy-Johnson, Nixon-Ford, Carter, and Reagan.

The Eisenhower, Carter, and Reagan regressor sub-matrices include the variables as described above. The relevant regressor matrix for Kennedy-Johnson includes an intercept, lagged dependent variable, inflation and unemployment squared, honeymoon for the first year of the Kennedy administration, and the Killed variable. That for Nixon-Ford is similar but includes the Watergate binary dummy rather than the Killed variable. Table 2.6 provides the OLS results for this estimation in addition to the adjusted R^2 and the Durbin m-statistic.

Table 2.7 gives the F-statistics for the tests for structural change applied to the sets of equations model which estimates the Kennedy-Johnson and Nixon-Ford administrations jointly. Tests 1-6 are the same tests as reported in Table 2.5. Test 7, a test of the null hypothesis that the honeymoon effects are equal across regimes, was added because in this format each submatrix includes a honeymoon variable. The conclusions with respect to structural change remain the same whether we use seven administrations or whether we combine Kennedy-Johnson and Nixon-Ford and thereby have five subgroups. With the exception of the honeymoon effect, all variables are significantly different from administration to administration.

2.5 Summary of Chapter 2

This chapter has presented several models for structural change and, where possible, has applied these models to the presidential popularity function. Through the dummy variable model and sets of equations model we have shown that there has been a structural shift in both the slope and intercept coefficients over time. Thus, estimating each administration in the sets of equations format or in a manner which allows all coefficients to vary is superior to constraining all slope coefficients to be equal by simply estimating the function over the entire time period.

Since our analysis has shown that it is wise to examine presidential regimes individually, we take a more detailed look at each administration in the following chapter. A few brief comments should be made at this juncture, however. First, while the quadratic model appears to work well for the Republican administrations, our success with the Democratic regimes is much more limited. Chapter 3 will present alternate specifications of the Kennedy-Johnson and Carter administrations in hopes of finding a more satisfactory specification.

Second, the coefficients of unemployment and inflation as presented in the tables are initial effects only. The full impact of changes in the macro variables on popularity may be found only after all adjustments have been made ($Y = Y_{-1}$). Chapter 3 will implement a nonlinear model which

makes direct estimates of the equilibrium values. Within this framework we will use intercept and slope dummies to make pairwise comparisons of the equilibrium values for the administrations which have significant macro coefficients, the Republican regimes.

Table 2.1
Maximum and Minimum Values for the Presidencies

	Maximum	Minimum
Eisenhower		
Popularity	79% (Dec. 1956)	49% (Mar. 1958)
Inflation	3.84% (May 1957)	-0.87% (July 1955)
Unemployment	7.6% (June 1953)	2.5% (Sept. 1958)
Kennedy-Johnson		
Popularity	80.5% (Apr. 1961)	35% (Aug. 1968)
Inflation	4.65% (Oct. 1968)	0.67% (Jan. 1962)
Unemployment	7.1% (May 1961)	3.4% (Sept-Nov.1968)
Nixon-Ford		
Popularity	67% (March 1973)	24% (July,Aug. 1974)
Inflation	12.26% (Jan 1975)	3.2% (June 1972)
Unemployment	9.0% (June 1975)	3.4% (Feb.-Jun.1969)
Carter		
Popularity	72.3% (Mar. 1977)	27% (July 1980)
Inflation	14.67% (Mar. 1980)	6.25% (Feb. 1978)
Unemployment	7.8% (July 1980)	5.6% (May 1979)
Reagan		
Popularity	68% (May 1981)	36.7% (Jan. 1983)
Inflation	12.37% (Feb. 1981)	1.15% (Jan. 1987)
Unemployment	10.8% (Dec. 1982, Jan. 1983)	6.1% (July 1987)

TABLE 2.2

Presidential Popularity Function Estimates
March 1953 to November 1988
(t-statistics in parentheses)

Coefficient	Estimate (t-statistic)
Constant	21.78 (8.68)
Y_{-1}	0.71 (23.93)
Honey	0.53 (5.06)
P^2	-0.03 (-3.48)
U^2	-0.08 (-4.69)
Killed	-0.01 (-4.69)
Water	-8.58 (-6.38)
Iran	-4.24 (-3.53)
Eisenhower	-1.31 (-1.35)
Kennedy	0.48 (0.47)
Johnson	-2.36 (-1.97)
Nixon	-2.07 (-2.00)
Ford	-0.48 (-0.46)
Carter	-3.59 (-3.61)
Adjusted R^2	0.90
Durbin's h	0.955
SEE	3.914

Table 2.3
Dummy Variable Model
Kennedy-Johnson and Nixon-Ford Estimated Jointly
(t-statistics in parentheses)

Intercept	49.84 (5.91)
Eisenhower Dummy	-20.78 (-1.90)
Kennedy-Johnson Dummy	-39.87 (-4.22)
Nixon-Ford Dummy	-13.74 (-1.46)
Carter Dummy	-33.35 (-3.44)
Y_{-1}	0.37 (3.53)
Eisenhower Dummy	0.23 (1.70)
Kennedy-Johnson Dummy	0.42 (3.31)
Nixon-Ford Dummy	0.06 (0.47)
Carter Dummy	0.33 (2.54)
Honeymoon	1.01 (3.11)
Eisenhower Dummy	-0.92 (-2.32)
Kennedy-Johnson Dummy	-0.96 (-2.11)
Nixon-Ford Dummy	-0.63 (-1.56)
Carter Dummy	-0.13 (-0.27)
P^2	-0.07 (-3.15)
Eisenhower Dummy	-0.21 (-2.14)
Kennedy-Johnson Dummy	-0.04 (-0.26)
Nixon-Ford Dummy	0.03 (1.16)
Carter Dummy	0.05 (2.17)
U^2	-0.22 (-5.16)
Eisenhower Dummy	0.10 (1.49)
Kennedy-Johnson Dummy	0.35 (3.39)
Nixon-Ford Dummy	0.10 (1.91)
Carter Dummy	0.14 (1.64)
Killed	-0.001 (-1.21)
Water	-13.84 (-8.35)
Iran	-10.11 (-5.11)

Adjusted $R^2 = 0.91$

Durbin m-statistic = 1.87

Table 2.4
Estimates for Sets of Equations Model
March 1953-November 1988
All Administrations Estimated Separately

Coefficient	Estimate (t-statistic)
Eisenhower Intercept	29.06 (4.47)
Y_{-1}	0.61 (7.30)
Honey	0.09 (0.40)
P^e	-0.28 (-3.07)
U^e	-0.12 (-2.35)
Kennedy Intercept	10.02 (0.99)
Y_{-1}	0.88 (8.27)
Honey	0.46 (0.83)
P^e	-0.12 (-0.10)
U^e	-0.06 (-0.26)
Johnson Intercept	12.96 (2.63)
Y_{-1}	0.60 (6.17)
P^e	-0.11 (-0.73)
U^e	0.61 (3.05)
Killed	-0.003 (-1.90)
Nixon Intercept	35.15 (4.51)
Y_{-1}	0.51 (5.42)
Honey	-0.05 (-0.19)
P^e	-0.06 (-1.90)
U^e	-0.23 (-2.46)
Water	-10.78 (-5.70)
Ford Intercept	14.86 (1.04)
Y_{-1}	0.62 (3.19)
P^e	-0.03 (-1.27)
U^e	0.07 (0.78)
Carter Intercept	16.49 (3.64)
Y_{-1}	0.70 (10.28)
Honey	0.88 (2.58)
P^e	-0.01 (-1.20)
U^e	-0.07 (-1.00)
Reagan Intercept	49.84 (6.30)
Y_{-1}	0.37 (3.76)
Honey	1.01 (3.31)
P^e	-0.07 (-3.35)
U^e	-0.22 (-5.50)
Iran	-10.11 (-5.45)

Adjusted R^2 = 0.92 Durbin's m-statistic = 1.21

Table 2.5
F-tests for Structural Change

	All Regimes	Kennedy v. Johnson	Nixon v. Ford
Test 1 All Common Variables Equal	3.0551** (24, 356)	1.9633 (4, 356)	1.6830 (4, 356)
Test 2 Intercepts Equal	3.8178** (6, 356)	0.0687 (1, 356)	1.5615 (1, 356)
Test 3 Lagged Depend. Variables Equal	2.4499* (6, 356)	3.8111 (1, 356)	0.2668 (1, 356)
Test 4 Inflation and Unemp. Terms Equal	3.4546** (12, 356)	2.4667 (2, 356)	2.9298 (2, 356)
Test 5 Inflation Terms Equal	2.3671* (6, 356)	0.0002 (1, 356)	0.7829 (1, 356)
Test 6 Unemp. Terms Equal	4.2947** (6, 356)	4.5764* (1, 356)	5.5036* (1, 356)

*Indicates that the null hypothesis is rejected at the 95% confidence level with the degrees of freedom indicated in the parentheses below the f-statistic value.

**Indicates that the null hypothesis is rejected at the 99% confidence level.

Table 2.6
Estimates for "Sets of Equations" Model
March 1953-November 1988
Kennedy-Johnson & Nixon-Ford Estimated Jointly

Coefficient	Estimate (t-statistic)
Eisenhower Intercept	29.06 (4.15)
Y_{-1}	0.61 (6.79)
Honeymoon	0.09 (0.37)
P^e	-0.28 (-2.86)
U^e	-0.12 (-2.19)
Kennedy-Johnson Intercept	10.90 (2.51)
Y_{-1}	0.78 (11.33)
Honeymoon	0.08 (0.24)
P^e	-0.08 (-0.55)
U^e	0.12 (1.30)
Killed	-0.002 (-1.66)
Nixon-Ford Intercept	35.97 (8.47)
Y_{-1}	0.43 (6.60)
Honeymoon	0.23 (1.13)
P^e	-0.04 (-2.83)
U^e	-0.11 (-3.63)
Watergate	-13.65 (-8.20)
Carter Intercept	16.48 (3.39)
Y_{-1}	0.70 (9.56)
Honeymoon	0.88 (2.40)
P^e	-0.01 (-1.11)
U^e	-0.07 (-0.93)
Reagan Intercept	49.84 (5.93)
Y_{-1}	0.37 (3.54)
Honeymoon	1.01 (3.11)
P^e	-0.07 (-3.15)
U^e	-0.22 (-5.17)
Iran	-10.11 (-5.12)

Adjusted R^2 = 0.91

Durbin m-statistic = 1.23

Table 2.7
F-tests for Structural Change

	All Regimes
Test 1 All Common Variables Equal	4.3360** (20, 366)
Test 2 Intercepts Equal	7.4323** (4, 366)
Test 3 Lagged Depend. Variables Equal	5.1442** (4, 366)
Test 4 Inflation and Unemp. Terms Equal	3.1674** (8, 366)
Test 5 Inflation Terms Equal	2.9679* (4, 366)
Test 6 Unemp. Terms Equal	3.1319* (4, 366)
Test 7 Honeymoons Equal	2.1686 (4, 366)

*Indicates that the null hypothesis is rejected at the 95% confidence level with the degrees of freedom indicated in the parentheses below the f-statistic value.

**Indicates that the null hypothesis is rejected at the 99% confidence level.

Figure 2.1
Eisenhower Popularity

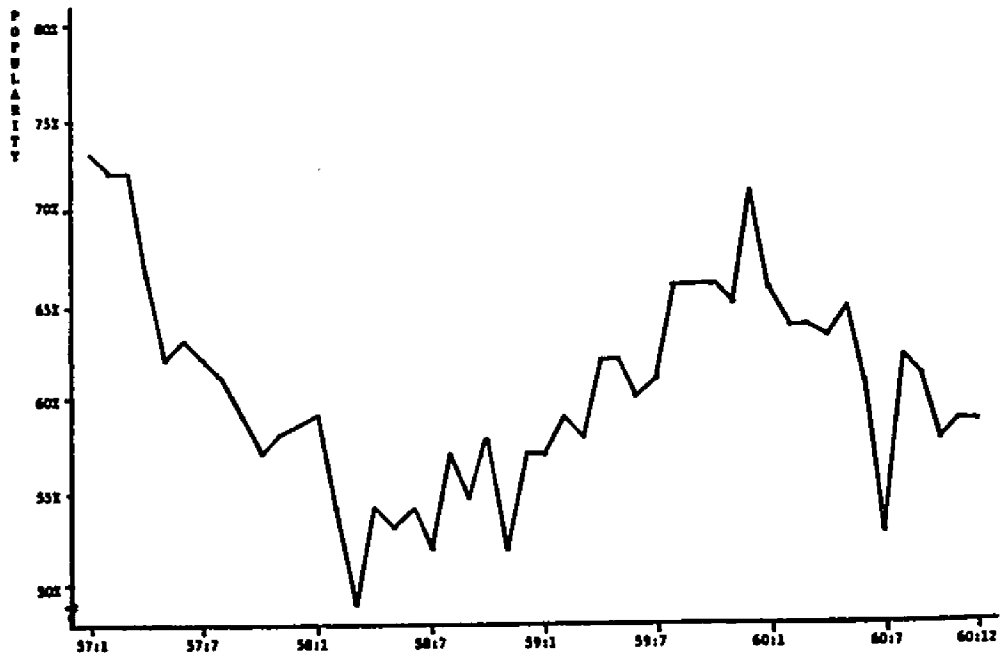


Figure 2.2--Kennedy-Johnson Popularity

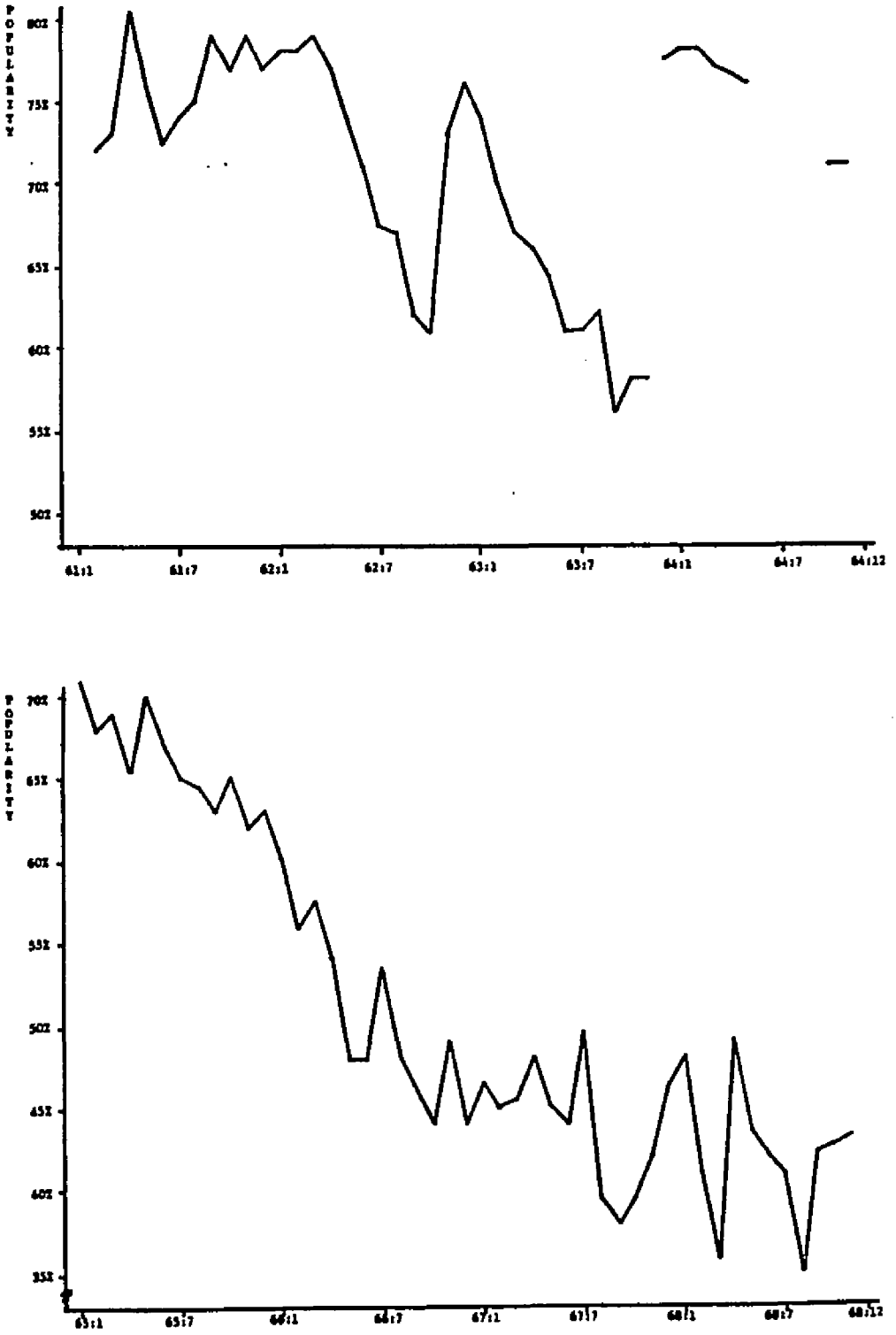


Figure 2.3 Nixon-Ford Popularity

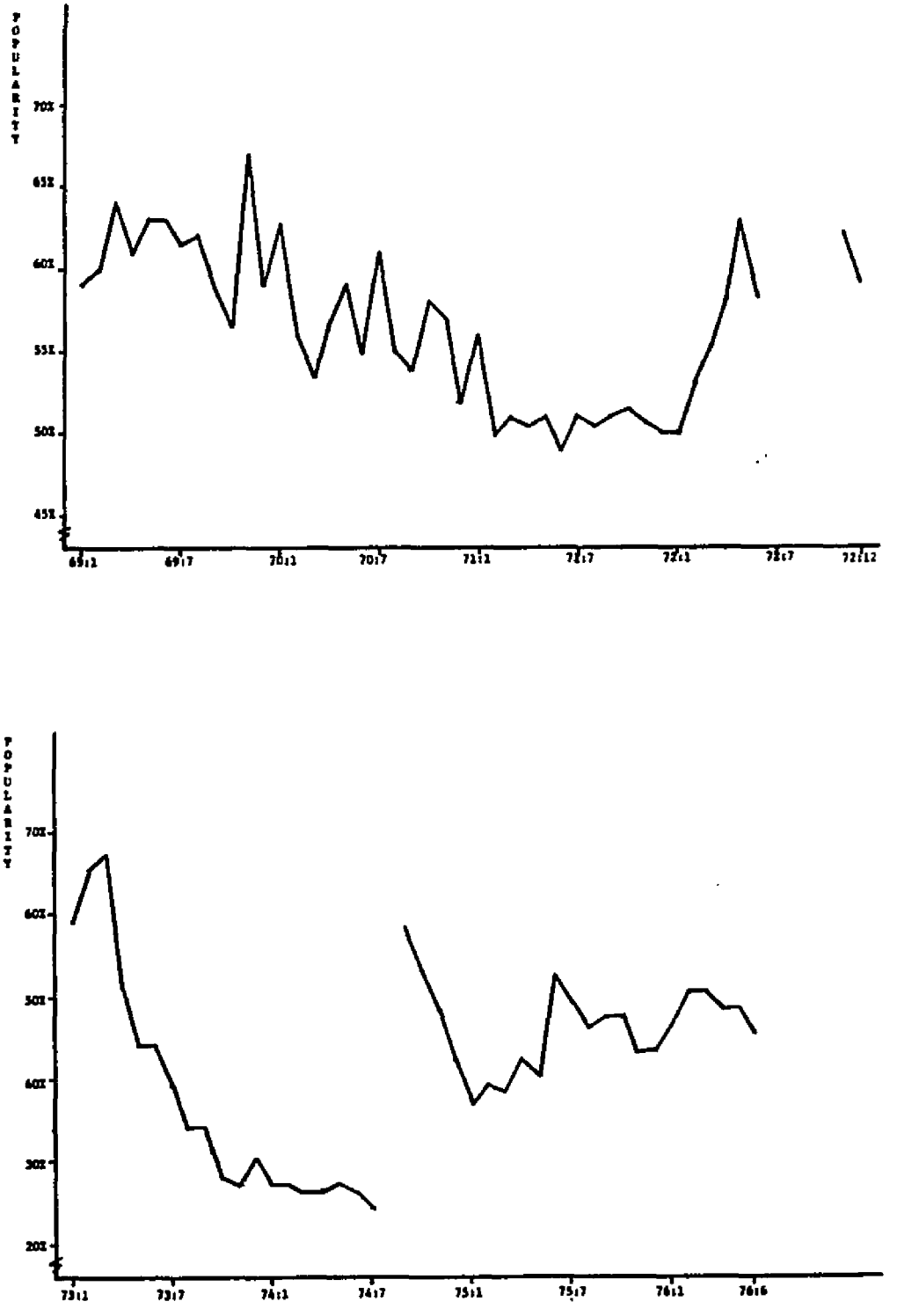


Figure 2.4
Carter Popularity

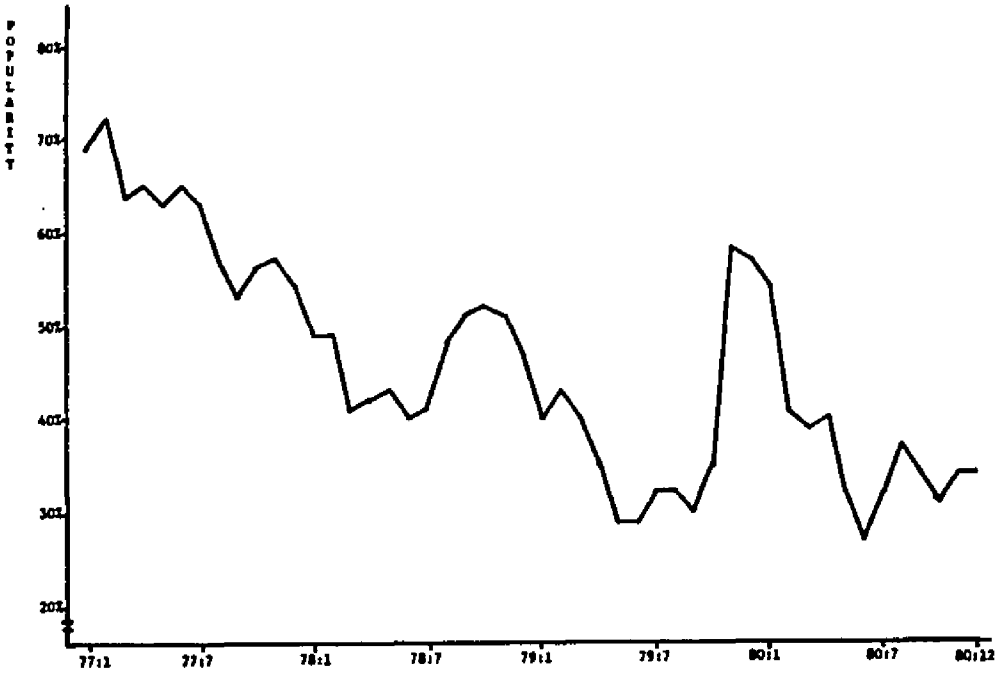
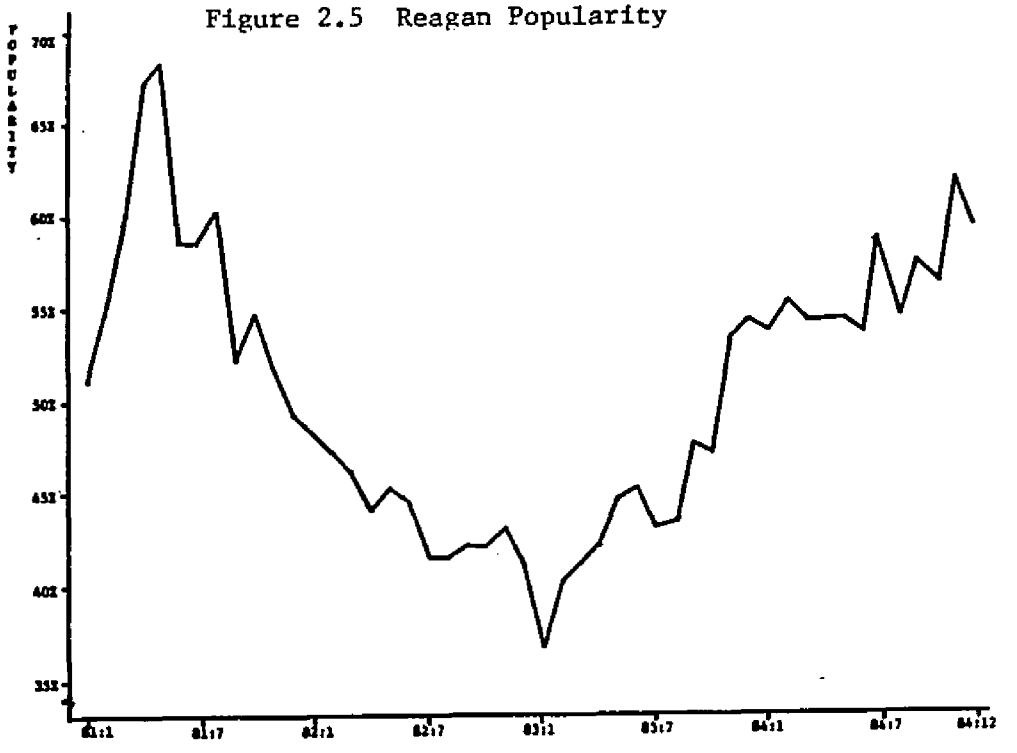
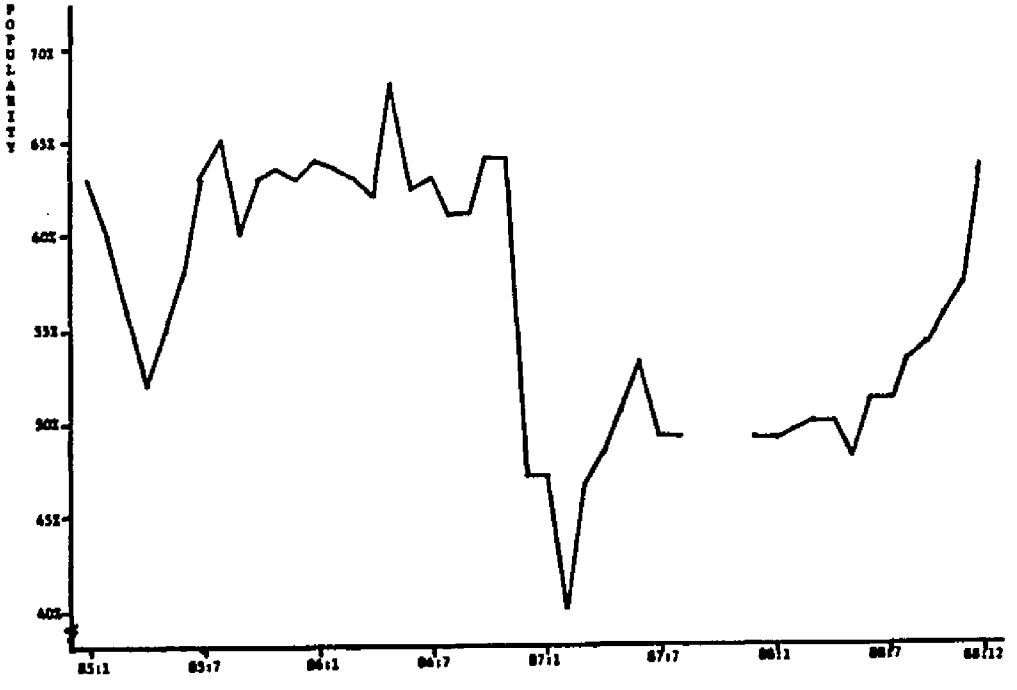


Figure 2.5 Reagan Popularity





CHAPTER 3

An Analysis of the Presidential Regimes

3.1 Introduction

The preceding chapter established that the presidential popularity function should be estimated in a manner which allows the coefficients to vary for each administration or regime. This chapter examines each regime in turn: the Eisenhower, the Kennedy-Johnson, the Nixon-Ford, the Carter, and the Reagan administrations. The section for each regime includes a sensitivity analysis and where applicable a discussion of the equilibrium values and an analysis of the social preference curves for the administrations. The final section of the chapter presents comparisons of the administrations.

3.2 The Eisenhower Administration

3.2.1 Sensitivity Analysis

The sets of equations estimates for the Eisenhower administration may be reproduced using OLS for the Eisenhower years only. This analysis is beneficial in that it allows us to report an adjusted R^2 and a Durbin h-statistic for this individual administration and thus gives a better indication of fit for the regime. The model we estimate for the Eisenhower administration is as follows:

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^e + \beta_3 U^e + \beta_4 Honey + \epsilon \qquad (3.1)$$

Column 1 of Table 3.1 presents the results of this basic model. Note that while the coefficient estimates are equal to those generated by the sets of equations model, the t-statistics are slightly different.[1]

With the exception of the honeymoon variable, all the estimated coefficients are significant and of the anticipated sign. The Durbin h-statistic is not significant at the 95% confidence level so there is no evidence of serial correlation in the residuals. The partial adjustment process is given by one minus the coefficient of the lagged dependent variable, $(1-\beta_1)$. Thus, approximately 40% of the effect of a change in inflation or unemployment is reflected in popularity in the first month and 77 percent of the adjustment is completed after three months.

As mentioned in the previous paragraph, the 12-month honeymoon trend variable is the only insignificant

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[1]Estimating the model in the sets of equations format as presented in Chapter 2 is not altogether equivalent to estimating separate regressions for the five presidential regimes. Five completely separate regressions produce five estimates of the error variance σ^2. A "pooled" estimate of σ^2 for the sets of equations model may be calculated from the five σ^2 values generated through separate regression analysis but this estimate is not equal to any of the individual least squares estimates. Because the error variances produced by the sets of equations model and running separate regressions differ, the t-values, and R^2 values will differ as well. When comparing the t-statistics of the two models, however, only the Carter honeymoon coefficient changes in significance. Thus, we see no real problem in switching from the sets of equations model to estimating the regimes individually.

coefficient in the model. This leads us to explore other formulations of the variable which may more accurately capture the early term effect. Column 2 of Table 3.1 employs a shorter version of the same variable, a 6-month rather than a 12-month declining trend. A 12-month binary variable is utilized in the regression presented in Column 3. In both cases, the honeymoon variable continues to be significant. The values of the other coefficients remain fairly constant across the regressions as do the values of the adjusted R^2 and the log of the likelihood function. Column 4 of this table presents the values of the regression coefficients when the honeymoon variable is excluded altogether. Because the honeymoon variable is significant for other administrations and because its inclusion does not greatly alter the values of the inflation and unemployment coefficients, we continue to include the 12-month declining trend to be consistent across regimes.

3.2.2 The Social Preference Curves

The full impact of the effects of inflation and unemployment on popularity are seen only after all adjustment processes have been made. Equilibrium values which exist after all adjustments to changes in inflation and unemployment are complete may be found by setting $Y = Y_{-1}$ in the original regression equation presented in Column

1 of Table 3.1. For the Eisenhower administration this process yields:

$$Y = 74.31 + 0.22Honey - 0.72P^2 - 0.30U^2 \qquad (3.2)$$

The effect of changes in P or U on Eisenhower's popularity may be found by calculating the partial derivatives $dY/dP = -1.437P$ and $dY/dU = -0.595U$. Two points of interest may be seen from these partial derivatives. First, Eisenhower was punished far more for increases in inflation than he was for equal increases in unemployment. Second, the effect on popularity of an increase in P or U increases greatly as the two variables increase. For example, an increase in inflation from 2% to 3% would decrease Eisenhower's popularity by 2.87 percentage points while an increase from 5 to 6 percent would cause popularity to decline by 7.18 points.

From equation 3.2 it is possible to draw equilibrium indifference curves for the Eisenhower administration. The honeymoon variable is set to zero, implying a period after the initial 12 months, and inflation is solved for in terms of unemployment at a constant popularity level. Figure 3.1 graphs these curves with popularity levels ranging from 50% to 70%. In addition, Figure 3.1 includes the time path followed by inflation and unemployment over the Eisenhower years.

The marginal rate of substitution between rates of inflation and unemployment consistent with a given level of presidential popularity is given by

$$dP/dU = -(\beta_3/\beta_2)U/P \qquad (3.3)$$

Substituting the estimated values of β_2 and β_3 in (3.3) gives $dP/dU = -0.536U/P$. Table 3.2 gives a grid of values for dP/dU over the relevant ranges of inflation and unemployment for the Eisenhower administration. At relatively high rates of inflation (the 4% and 3% inflation columns), with few exceptions dP/dU is absolutely less than one. This means that to keep popularity constant the increase (decrease) in the inflation rate is less than the corresponding decrease (increase) in the unemployment rate. With few exceptions, dP/dU is absolutely greater than one at low inflation rates indicating that an increase (decrease) in inflation must be accompanied by a larger decrease (increase) in unemployment to maintain a constant popularity rating. A second point of interest which may be seen from Table 3.2 and Figure 3.1 is that at relatively high rates of inflation (and relatively low unemployment rates) the social indifference curves become very flat.

3.3 The Kennedy-Johnson Administration

Following the procedure outlined for the Eisenhower administration, we estimate the following equation by OLS for the Kennedy-Johnson administration:

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^2 + \beta_3 U^2 + \beta_4 \text{Killed} + \beta_5 \text{Honey} + \epsilon \quad (3.4)$$

Table 3.3, Column 1 provides the results with t-statistics in parentheses, adjusted R^2, Durbin h-statistic, standard error of the regression and the log of the likelihood function. As with the Eisenhower administration, the estimated coefficients are equal to those produced in the sets of equations model, though the t-statistics differ slightly.

Upon examining these results, we see that the unemployment term is incorrectly signed and both economic variables are statistically insignificant as are the honeymoon and Killed variables. Columns 2 and 3 of Table 3.3 present results of eliminating first the inflation squared and then the unemployment squared term. In both cases, however, the remaining macroeconomic coefficient continues to be insignificant and the coefficient of the unemployment term in Column 3 remains positive. Column 4 presents results of a regression employing inflation and unemployment linearly and again the macroeconomic effects are insignificant.

Though the insignificance of the macroeconomic coefficients is troublesome, other researchers employing different models have had similar difficulties with the Kennedy and Johnson administrations. Norpoth and Yantek (1983) found that within an ARIMA model the lags of unemployment and inflation were either insignificant or of the wrong sign for Johnson. Kernell (1978) found inflation and unemployment to be insignificant for both Kennedy and Johnson.

As with the Eisenhower administration, the honeymoon variable is insignificant for the Kennedy-Johnson administration. Columns 1-3 of Table 3.4 present alternate specifications of this variable. These results may be compared with the basic model in Column 1 of Table 3.3. The honeymoon variable in Column 1 of Table 3.4 is a six-month trend variable for Kennedy and that in Column 2 is a 12-month binary honeymoon variable. Both of these formulations assume no honeymoon period for Johnson. The honeymoon variable in Column 3 is a 12-month declining trend for the Kennedy administration and a 6-month declining trend for Johnson, thus assuming that the honeymoon period was shorter for Johnson than for Kennedy. All three formulations are statistically insignificant and do not increase the portion of error variance accounted for by the equation and thus do not improve upon the basic specification presented in Column 1, Table 3.3.

The Killed variable employed thus far has been the number of U.S. casualties in each month of involvement in the Vietnam conflict. It is marginally significant in several of the regressions. It has been argued that this measure does not adequately measure the growing discontent over U.S. involvement in the region and that cumulative battle deaths would be a more satisfactory measure. Column 4 of Table 3.4 presents results of an analysis using cumulative battle deaths. Since it is statistically insignificant, however, it is deemed inferior to the initial measure.

It might be argued that a dummy variable for the Johnson administration would be appropriate to account for personality factors influencing the two regimes. The series of F-tests presented in Table 2.5 of Chapter 2 indicates that there is no significant difference between the two intercept terms, however, and so we do not include this intercept dummy.

3.4 The Nixon-Ford Administration

3.4.1 Sensitivity Analysis

The basic model estimated for the Nixon-Ford administration is

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^e + \beta_3 U^e + \beta_4 \text{Water} + \beta_5 \text{Honey} + \epsilon \quad (3.5)$$

The OLS results, equivalent to those found in the sets of equations format, are presented in Column 1 of Table 3.5 along with the adjusted R^{2}, Durbin h-statistic, standard error of the regression and log of the likelihood function. With the exception of the honeymoon coefficient, all coefficients are statistically significant. The Durbin h-statistic indicates that serially correlated errors are not a problem for this regime. The adjustment process is given by $(1-\beta_1)$ and indicates that in the first month 57% of the adjustment to changes in inflation and unemployment is complete.

The Watergate variable, Water, employed in this analysis takes the value of 1 for the period 1973:4-1974:7, a value of .5 for August, 1974, and 0 otherwise. This measure varies somewhat from that chosen by other researchers to represent the effect of Watergate on Nixon's popularity. Chappell (1983) and Chappell and Keech (1985ab) employ a shorter binary variable, beginning the variable with 1973:4, corresponding to the "Saturday Night Massacre," and ending with 1974:2 on a quarterly basis. Column 2 of Table 3.5 presents the results of employing this variable, Short Water Binary, on a monthly basis. Frey and Schneider (1978) utilize a trend variable taking the values 1,3,5,5,5 for the quarterly period 1973:2-1974:2. Column 3 of Table

3.5 gives the regression values when a similar variable, Trend Water, is employed on a monthly basis.[e]

When comparing the results of the three formulations of the Watergate variable, we see that the original specification presented in Column 1 is superior to the other specifications for several reasons. First, it yields the highest adjusted R^2, indicating that a larger portion of error variance is accounted for in this equation. Second, the coefficient of this Watergate variable is the most highly significant. Finally, the standard error of the regression is lowest for this specification.

We may test for the superiority of the original formulation over the alternative formulations through a series of pairwise tests.[a] The popularity function is estimated including all regressors in the basic model. One of the alternative dummy specifications is added in turn. If the additional Watergate dummy is insignificant, the original formulation is deemed superior. If both are significant then each measure adds information and should be included. In this case, models using just one measure are rejected. The t-statistic for Short Water Binary is -1.43 and for Trend Water is -1.82. Thus, we conclude that our original formulation is better than the two alternatives.

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[e]The variable is followed as follows: a value of 1 for 1973:4-1973:6, 3 for 1973:7-1973:9, and 5 for 1973:10-1974:7.

[a]See Davidson and MacKinnon (1981) for more information.

Just as with the Eisenhower and Kennedy-Johnson administrations, the coefficient of the honeymoon variable is insignificant for the Nixon-Ford regime. Columns 1-3 of Table 3.6 present the alternative formulations of the variable examined for both of the preceding administrations. The adjusted R^2 for these three is equal to that of the original model, presented in Column 1 of Table 3.5. In addition, neither of them are statistically significant. Column 4 of Table 3.6 presents the regression results when the honeymoon variable is excluded altogether. The slope and intercept values do not differ greatly from those of the original model which includes the honeymoon variable and thus our calculations of the social indifference curves to follow will be based upon the original model in order to be consistent.

3.4.2 The Nixon-Ford Social Preference Curves

By setting $Y = Y_{-1}$ in Column 1 of Table 3.5 it is possible to find the impact on popularity of inflation and unemployment after full adjustments have been made. This process yields

$$Y = 63.04 - 0.07P^e - 0.19U^e - 23.93\text{Water} + 0.14\text{Honey} \qquad (3.6)$$

The partial derivatives $dY/dP = -.137P$ and $dY/dU =$

-0.387U give the effect of changes in P or U on the Nixon-Ford administration's popularity. As was noted for the Eisenhower administration, the effect on popularity of an increase in either macro variable increases greatly as the two variables increase. As compared with the Eisenhower administration, it appears that Nixon-Ford was punished slightly less for increases in either variable than was Eisenhower.

Figure 3.2 gives the social indifference curves for the Nixon-Ford administration with popularity levels ranging from 38% to 62%. These curves are derived by setting Water = Honey = 0 in Equation 3.6 and solving for P in terms of U at a constant popularity rating.

Also included in Figure 3.2 is the time path of inflation and unemployment during the Nixon-Ford years. Though the time path of inflation and unemployment during the early sixties followed the pattern predicted by Phillips curve behavior, this time path indicates the deviations from that pattern which caused economists to consider shifts in the Phillips curve relationship. The large fluctuations in inflation with nonexistent or relatively small changes in unemployment in the opposite direction are indicative of the stagflation caused by oil supply shocks during the period. As inflation rose with unemployment held fairly constant or increasing slightly, popularity decreased dramatically.

Later, as both inflation and unemployment fell approval ratings improved as well.

The slope of the indifference curve, or the marginal rate of substitution, is found by solving for dP/dU and yields -2.71U/P. Table 3.7 presents a table of values for dP/dU over the range of inflation and unemployment rates experienced during the regime. In all cases the values are less than 1 in absolute terms. This implies that an increase (decrease) in the inflation must be accompanied by a larger decrease (increase) in unemployment in order to maintain a constant popularity rating.

3.5 The Carter Administration

As with the preceding administrations, we estimate the following equation by OLS for the Carter administration:

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^e + \beta_3 U^e + \beta_4 \text{Honey} + \epsilon \qquad (3.7)$$

The estimated coefficients, presented in Column 1 of Table 3.8, are equivalent to those found via the sets of equations model, but as with the other administrations, the t-statistics differ slightly. The t-statistics are in parentheses beneath the coefficient and the adjusted R^2, Durbin h-statistic, standard error of the regression, and the log of the likelihood function are also reported.

Both of the economic terms in the basic model (Column 1, Table 3.8) are of the expected sign but are statistically insignificant. The adjustment process (given by $1-\beta_1$) indicates that 30% of the adjustment to changes in inflation and unemployment occurs within the first month. Within this analysis, the honeymoon variable is marginally significant.

The Durbin h-statistic unfortunately exceeds the critical value and thus we must conclude that the errors of the model are serially correlated. Since the presence of serially correlated errors causes the t-statistics to be biased upward, however, correction for the problem would not cause the insignificant macroeconomic coefficients to be significant.

As with the Kennedy-Johnson regime, we examine the effect of alternately dropping the unemployment squared term and then the inflation squared term. The results of this analysis are presented in Columns 2 and 3 respectively of Table 3.8. In both cases, the remaining economic variable continues to be insignificant and the Durbin h-statistic still indicates the presence of serially correlated errors. Column 4 of the table presents an analysis which includes inflation and unemployment linearly, but the macroeconomic coefficients remain insignificant and the serially correlated errors persist. The adjusted R^e terms for each regression remain fairly high, due in large part to the inclusion of the lagged dependent variable.

Continuing with the sensitivity analysis, we explore the various formulations of the honeymoon variable examined for the preceding administrations in Table 3.9. The honeymoon variable employed in the original model (Column 1, Table 3.8) is a 12-month declining trend variable. Column 1 of Table 3.9 includes a 6-month declining trend variable while Column 2 employs a 12-month binary honeymoon dummy. Neither of these measures change the basic conclusions found in the original model. Since both honeymoon variables are statistically insignificant, since the macroeconomic variables in each equation remain insignificant, and since serially correlated errors are present, these formulations are not an improvement over the original specification.

3.6 The Reagan Administration

3.6.1 Sensitivity Analysis

Turning to the Reagan administration, the basic model estimated for this regime is

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^e + \beta_3 U^e + \beta_4 Iran + \beta_5 Honey + \epsilon \qquad (3.8)$$

Column 1 of Table 3.10 gives the results of this estimation, again with t-statistics in parentheses. All of the coefficients have the anticipated sign and are statistically significant with t-statistics greater than four in absolute

terms. In addition, the Durbin h-statistic indicates that the error terms are not serially correlated.

Although the 12-month declining trend honeymoon variable is statistically significant for the Reagan years, in keeping with the previous sections we examine other formulations of the variable. Columns 2 and 3 of Table 3.10 present the results of employing first a 6-month declining trend honeymoon and then a 12-month binary honeymoon. There is little difference between the results presented in Columns 1 and 2, but the serial correlation present when using the binary dummy in Column 3 make this alternative unattractive.

The Iran variable chosen for the sets of equations model and presented in Column 1 of Table 3.10 is a binary variable beginning with December 1986 and extending to the end of the administration. While it is a simple matter to pinpoint the month the public first knew of the affair, it is difficult to determine a priori how long and in what manner the scandal impacted his popularity. Table 3.11 presents several alternative measures of the Iran-Contra affair. Iran 2 is a binary dummy beginning with December 1986 and continuing until August 1987, the last month of popularity figures before a data gap of three months. Assuming that the impact of the event lessened over time, Iran 3 takes the value of 1 for 1986:12-1987:8 and following the data gap takes the value of 0.9 in 1988:1 declining to

0.1 in 1988:9 and takes the value of 0 otherwise. Iran 4 is a shorter version of the previous variable, taking the value of 0.4 in 1988:1 declining to 0.1 in 1988:4. Finally, the fourth column of Table 3.11 employs two Iran dummy variables, the first taking the value of 1 for 1986:12-1987:12 and 0 otherwise and the second taking the value of 1 for the time period after the data gap, 1988:1-1988:11, and 0 otherwise.

The test used to determine superiority of Watergate variables for the Nixon-Ford regime may be applied to the Iran-Contra variable as well. The popularity function is estimated including all regressors in the basic model and the alternative dummies are added in turn. The t-statistic for Iran 2 is -1.18, that for Iran 3 is -2.06, and for Iran 4 the value is -1.34. This indicates that our original formulation is better than Iran 2 and Iran 4 and is at least as good as Iran 3.

A comparison of the results in Table 3.11 with the basic model presented in Column 1 of Table 3.10 indicates that the t-statistic of the Iran coefficient for the basic model is larger in absolute terms than that for either of the other models. In addition, the log of the likelihood function is larger in absolute terms than that of either Column 1, 2, or 3 of Table 2 and the adjusted R^e is larger as well. Column 4 indicates that the binary variable pre-data gap and post-data gap are both significant and thus

gives further evidence that the Iran variable in the basic model is appropriate.

3.6.2 Social Preference Functions for the Reagan Administration

After all adjustment processes have taken place (setting $Y = Y_{-1}$), the equilibrium values for the Reagan Administration can be seen as follows:

$$Y = 79.66 + 1.61Honey - 0.11P^{e} - 0.35U^{e} - 16.15Iran \quad (3.9)$$

As with the other Republican administrations, we find the effects of changes in inflation and unemployment on Reagan's popularity by taking the partial derivatives. These values are $dY/dP = -0.218P$ and $dY/dU = -0.694U$.

Figure 3.3 depicts equilibrium indifference curves for popularity ratings ranging from 34% to 70%. The curves have been drawn assuming that Honey = Iran = 0; that is, the time period after the honeymoon period is over and before the Iran-Contra affair.

The marginal rate of substitution between inflation and unemployment consistent with a given level of popularity may be calculated as $dP/dU = -3.182\ U/P$. Table 3.12 gives a grid of values for dP/dU for the inflation and unemployment

rates relevant to the Reagan years. Note first that for all tabulated values, dP/dU is absolutely greater than one. This means that to keep popularity constant the increase (decrease) in the inflation rate is always greater than the corresponding decrease (increase) in the unemployment rate. Note also that the indifference curves become very steep for relatively low rates of inflation.

Figure 3.3 also shows the actual path taken by inflation and unemployment. The pattern is that predicted by standard dynamic macroeconomic models in response to a deflationary shock when it is assumed that inflation expectations adjust adaptively. Unemployment rose as inflation fell and then unemployment fell as a new more or less steady low rate of inflation was maintained.[4] Reagan's popularity first fell as the effect of the increase in unemployment had more effect than the decline in inflation. Then, as unemployment fell with inflation relatively low, popularity rose markedly.

3.7 A Comparison of Republican Administrations

The previous sections have examined the presidential popularity functions and social preference curves for each administration. This section will make some comparisons

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[4]The low rates of inflation in 1986 and early 1987 reflect falls in energy prices. The annual energy inflation rates for 1984 and 1985 were 1.0% and 0.7% respectively. The annual rate for 1986 decreased dramatically to -13.8% and increased to 0.5% in 1987.

among the various regimes. The preceding analysis has shown that the macroeconomic variables for the Democratic regimes are statistically insignificant. A complete explanation of this finding is a topic for future research. At the moment, we focus upon the Republican terms only.

3.7.1 Social Preference Functions

Figure 3.4 presents the social preference functions for the three Republican administrations at a 50% popularity rating. Note that the slopes and positions of the curves are quite different. The slope of the Eisenhower curve,-0.536U/P, is much flatter than the slopes for Nixon-Ford and Reagan, -2.71U/P and -3.18U/P respectively.[5] Though it is difficult to make definitive statements regarding the cause of the differences in slopes and positions, we may make some general comments.

The Reagan 50% indifference curve is farthest from the origin, indicating that he was allowed to have higher inflation and unemployment rates and yet maintain the same popularity level as the other two administrations. If Reagan is considered inherently more popular than his Republican predecessors this would be expected. This is the interpretation most commonly assumed. Using this argument, the Nixon-Ford curve lies above the Eisenhower curve at

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[5]These slopes were derived in sections 3.2.2, 3.4.2, and 3.6.2.

almost all points because Nixon-Ford was inherently more popular for given levels of inflation and unemployment than was Eisenhower, an assertion open to much debate.

A second explanation for the large rightward shifts in the curves from Eisenhower to Reagan is that the public has gradually become more accustomed to higher rates of inflation and unemployment through the years. Inflation rates which seemed excessively high for the Eisenhower years, for example, may be deemed moderate in the Reagan eighties.

The 50% popularity rating is extremely low for the Republican administrations. Eisenhower's popularity only once fell below this level. Figure 3.5 presents the indifference curves for the three regimes at the average popularity rating for the presidencies, 55%. The Reagan curve remains farther to the right than the other two. As we compare the relative positions of the three curves, however, it appears that the Nixon-Ford curve has shifted inward far more than the others from 50% to 55%.

Figure 3.6 presents the indifference curves at a 62% popularity rating, a level more typical for Eisenhower and Reagan. The most striking feature of this graph in comparison with Figures 3.4 and 3.5 is that the Nixon-Ford curve lies everywhere beneath the equivalent curve for Eisenhower. Neither of the hypotheses presented for the differences in the positions of the curves can explain the

change in the ordering of the Eisenhower and Nixon-Ford curves from Figure 3.4 to Figure 3.6.

3.7.2 Equilibrium Values

A second method of examining differences between the three Republican administrations is by analyzing the equilibrium values of the popularity functions for each regime. We make use of a method employed in Smyth, Washburn, and Dua (1989a) modified by the dummy variable technique presented in Chapter 2 to account for two or more regimes. In order to test the stability of the equilibrium coefficients between the Eisenhower and Nixon-Ford administrations, we estimate the following model using monthly data from 1953:2-1960:12, 1969:2-1976:6[46]:

$$Y = [\delta + c(N*\delta)]\,[\alpha_0 + \beta_0(N) + \alpha_1 P^2 + \beta_1(N*P^2) + \alpha_2 U^2 + \beta_2(N*U^2)] + \alpha_3 Honey + \beta_3(N*Honey) + \beta_4 NWater + [1 - \delta - c(N*\delta)]Y_{-1} \qquad (3.10)$$

where δ, c, α_i, and β_i are the coefficients to be estimated, N is a dummy variable for the Nixon-Ford administration, and all other variables are defined above. This technique allows the adjustment process, δ, to be estimated directly and the estimated coefficients of the social preference function are their equilibrium values. The model is

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[46]Gaps in the data exist as described in Chapter 2.

estimated nonlinearly and the results are given in Table 3.13.

The α terms may be interpreted as the actual equilibrium coefficients for the Eisenhower administration and the β coefficients represent the differential between the Eisenhower value and the actual Nixon-Ford value. Thus, the t-statistics associated with the β terms reflect whether the β coefficient is statistically different from the corresponding α coefficient. The c coefficient is the Nixon-Ford differential for the lagged adjustment process δ.

Since the Nixon-Ford intercept dummy is statistically significant, we infer that "personality factors" did play a role in our assessment of the two regimes. Since the inflation differential is significant, then inflationary perceptions appear to have changed over time, with the public becoming more accoustomed to higher rates of inflation. The insignificant unemployment differential indicates that similar changes in unemployment preferences did not occur during the time period.

Our interpretation of the significance (or insignificance) of the Nixon-Ford inflation and unemployment dummy variables is dependent upon the extent to which we assume "personality" forces also affect those coefficients. If we assume that all "personality" influences are accounted for in the intercept and intercept differential, then the assertions made in the preceding paragraph are valid. If,

however, the public is not able to disentangle perceptions regarding the president "as a man" from economic perceptions, then the interpretation in the preceding paragraph may be distorted. The significant change in views toward inflation might be accounted for as much by positive (or negative) attitudes toward the man himself as by any real changes in inflationary perceptions.

A similar comparison of equilibrium values may be made for the Nixon-Ford and Reagan administrations by estimating the following model:

$$Y = [\delta + c(N*\delta)]\,[\alpha_0 + \beta_0(N) + \alpha_1 P^e + \beta_1(N*P^e) + \alpha_2 U^e + \beta_2(N*U^e)] + \alpha_3 Honey + \beta_3(N*Honey) + \alpha_4 Iran + \beta_4(N*Water) + [1 - \delta - c(N*\delta)]Y_{-1} \qquad (3.11)$$

The model is estimated using monthly data for 1969:2-1976:6, 1981:2-1988:12.[7] The α_i terms are the Reagan base terms, the β_i coefficients are the Nixon-Ford differential terms, δ is the Reagan adjustment coefficient and c is the Nixon-Ford differential. Table 3.14 presents the empirical results.

The t-statistic of the Nixon-Ford intercept differential indicates that Reagan was a substantially more popular president. There was no significant difference in adjustment processes as evidenced by the insignificant c

[7]Gaps in the data exist as described in Chapter 2.

(adjustment differential) coefficient. The t-statistics of β_1 and β_2, the Nixon-Ford inflation and unemployment differential coefficients, indicate that while inflationary perceptions remained constant over the time period, the public's perceptions toward unemployment changed such that Reagan was punished (rewarded) significantly more for increases (decreases) in unemployment than was Nixon-Ford. These results should, of course, be taken with the same reservations as expressed with respect to the Eisenhower-Nixon-Ford equilibrium value analysis.

3.8 Summary

This chapter has provided a detailed analysis of each presidential administration, presenting a sensitivity analysis when alternative specifications of the dummy variables are used. For the Republican administrations, the chapter includes a discussion of the social preference curves and their slopes. Despite efforts at achieving significant results for the Democratic administrations, the "best" models do not explain popularity well. The insignificance of the Democratic macroeconomic variables and a lack of a complete explanation for this finding are perhaps the most perplexing aspects of the chapter.

When comparing Republican administrations, this chapter has shown that there are indeed differences in slopes and intercept terms of the social preference functions. Thus,

each Republican regime should be estimated in a manner which allows the coefficients to vary. It is quite difficult, however, to establish a complete explanation for the causes of the shifts over time as such shifts may reflect either differences associated with the personalities of the presidents as perceived by the public or with changing attitudes with respect to inflation and unemployment.

Table 3.1
Estimates for the Eisenhower Administration
(t-statistics in parentheses)

	1	2	3	4
Intercept	29.06 (4.56)	28.45 (4.54)	31.43 (4.77)	29.57 (4.75)
Y_{-1}	0.61 (7.46)	0.62 (7.60)	0.59 (7.09)	0.61 (7.49)
P^e	-0.28 (-3.14)	-0.28 (-3.13)	-0.31 (-3.37)	-0.29 (-3.26)
U^e	-0.12 (-2.40)	-0.11 (-2.39)	-0.15 (-2.87)	-0.13 (-2.83)
12-month trend honey	0.09 (0.40)			
6-month trend honey		0.83 (1.25)		
12-month binary honey			-1.23 (-0.87)	
Adjusted R^2	0.75	0.75	0.75	0.75
Durbin's h	0.290	0.010	0.533	0.583
Standard Error	3.40	3.37	3.39	3.38
Log of Likelihood Ftn.	-229.91	-229.18	-229.60	-230.00

Table 3.2
dP/dU for Alternate Combinations of P and U
Eisenhower Administration

P \ U	8%	7%	6%	5%	4%	3%	2%
4%	-1.07	-0.94	-0.80	-0.67	-0.54	-0.40	-0.27
3%	-1.42	-1.25	-1.07	-0.89	-0.71	-0.54	-0.36
2%	-2.14	-1.88	-1.61	-1.34	-1.07	-0.82	-0.54
1%	-4.29	-3.75	-3.22	-2.68	-2.14	-1.61	-1.07

Table 3.3
Estimates for the Kennedy-Johnson Administration
(t-statistics in parentheses)

	1	2	3	4
Intercept	10.90 (2.53)	11.54 (2.74)	9.36 (2.89)	9.81 (1.43)
Y_{-1}	0.78 (11.70)	0.82 (13.87)	0.80 (13.04)	0.77 (11.23)
Honey	0.08 (0.25)	0.39 (1.85)	0.04 (0.13)	0.15 (0.50)
P^2	-0.08 (-0.57)	-0.12 (-0.90)		
U^2	0.12 (1.34)		0.14 (1.52)	
Killed	-0.002 (-1.71)	-0.003 (-1.93)	-0.002 (-1.98)	
P				-0.62 (-0.67)
U				1.17 (1.14)
Adjusted R^2	0.93	0.93	0.93	0.93
Durbin's h	-0.050	-1.022	-1.024	-0.858
Standard Error	3.61	3.63	3.60	5.74
Log of Likelihood Ftn.	-229.42	-230.38	-229.60	-229.08

Table 3.4
Estimates for the Kennedy-Johnson Administration
Alternate Specifications of "Honey" and "Killed"
(t-statistics in parentheses)

	1	2	3	4
Intercept	10.80 (2.61)	11.28 (2.60)	11.41 (2.65)	8.32 (2.08)
Y_{-1}	0.78 (11.83)	0.78 (11.86)	0.78 (11.89)	0.80 (11.68)
P^2	-0.08 (-0.57)	-0.09 (-0.63)	-0.09 (-0.66)	-0.10 (-0.48)
U^2	0.13 (1.82)	0.11 (1.17)	0.11 (1.22)	0.16 (1.64)
Killed--Battle deaths	-0.002 (-1.71)	-0.002 (-1.74)	-0.002 (-1.75)	
Killed--Cumulative battle deaths				-0.0001 (-0.35)
6-month trend honey	0.28 (0.36)			
12-month binary honey		0.91 (0.44)		
12-mo. Kennedy 6-mo. Johnson trend honey			0.17 (0.56)	
Adjusted R^2	0.93	0.93	0.93	0.93
Durbin's h	-0.957	-0.966	-0.949	-1.281
Standard Error	3.613	3.611	3.608	3.677
Log of Likelihood Ftn.	-229.39	-229.35	-229.29	-230.90

Table 3.5
Estimates for the Nixon-Ford Administration
Alternate Watergate Specifications
(t-statistics in parentheses)

	1	2	3
Intercept	35.97 (7.72)	24.15 (4.50)	37.25 (6.84)
Y_{-1}	0.43 (6.02)	0.51 (6.64)	0.39 (4.56)
P^e	-0.04 (-2.58)	-0.03 (-1.49)	-0.04 (-2.21)
U^e	-0.11 (-3.31)	-0.04 (-1.05)	-0.11 (-2.89)
Honey	0.23 (1.03)	0.46 (1.71)	0.38 (1.58)
Long Water Binary	-13.65 (-7.47)		
Short Water Binary		-9.89 (-3.68)	
Trend Water			-3.27 (-6.30)
Adjusted R^2	0.87	0.81	0.85
Durbin's h	0.421	0.388	-0.898
Standard Error	4.09	4.95	4.36
Log of Likelihood Ftn.	-234.41	-250.38	-239.84

Table 3.6
Estimates for the Nixon-Ford Administration
Alternate Specifications of "Honey"
(t-statistics in parentheses)

	1	2	3	4
Intercept	35.92 (7.68)	36.10 (7.75)	35.36 (2.65)	36.08 (7.74)
Y_{-1}	0.44 (6.14)	0.43 (5.89)	0.43 (6.15)	0.44 (6.20)
P^e	-0.04 (-2.50)	-0.04 (-2.62)	-0.05 (-2.88)	-0.04 (-2.48)
U^e	-0.12 (-3.67)	-0.11 (3.14)	-0.10 (-2.70)	-0.12 (-4.00)
Water	-13.77 (-7.55)	-13.63 (-7.44)	-13.10 (-7.01)	-13.92 (-7.69)
6-month trend honey	0.46 (0.76)			
12-month binary honey		1.70 (0.44)		
12-mo. Nixon 6-mo. Ford trend honey			0.35 (1.56)	
Adjusted R^2	0.87	0.87	0.87	0.87
Durbin's h	0.402	0.371	0.043	0.465
Standard Error	4.10	4.09	4.06	4.09
Log of Likelihood Ftn.	-234.67	-234.40	-233.68	-234.97

Table 3.7
dP/dU for Alternate Combinations of P and U
Nixon-Ford Administration

P \ U	9%	8%	7%	6%	5%	4%	3%
12%	-2.03	-1.81	-1.58	-1.36	-1.13	-0.90	-0.68
11%	-2.22	-1.97	-1.72	-1.48	-1.23	-0.99	-0.74
10%	-2.44	-2.17	-1.90	-1.63	-1.36	-1.08	-0.81
9%	-2.71	-2.41	-2.11	-1.81	-1.51	-1.20	-0.90
8%	-3.05	-2.71	-2.37	-2.03	-1.69	-1.36	-1.02
7%	-3.48	-3.10	-2.71	-2.32	-1.94	-1.55	-1.16
6%	-4.07	-3.61	-3.16	-2.71	-2.26	-1.81	-1.36
5%	-4.88	-4.34	-3.79	-3.25	-2.71	-3.79	-1.63
4%	-6.10	-5.42	-4.74	-4.07	-3.39	-2.71	-2.03
3%	-8.13	-7.23	-6.32	-5.42	-4.52	-3.61	-2.71

Table 3.8
Estimates for the Carter Administration
(t-statistics in parentheses)

	1	2	3	4
Intercept	16.49 (2.44)	13.71 (2.59)	15.14 (2.32)	21.46 (2.03)
Y_{-1}	0.70 (6.89)	0.71 (7.06)	0.73 (7.59	0.70 (5.76)
Honey	0.88 (1.73)	0.69 (1.64)	0.99 (2.03)	0.88 (1.74)
P^2	-0.01 (-0.80)	-0.02 (-1.15)		
U^2	-0.07 (-0.67)		-0.11 (-1.06)	
P				-0.29 (-0.81)
U				-1.01 (-0.71)
Adjusted R^2	0.81	0.81	0.81	0.81
Durbin's h	2.254	2.352	2.112	2.312
Standard Error	5.17	5.14	5.15	5.18
Log of Likelihood Ftn.	-138.23	-138.48	-138.59	-138.24

Table 3.9
Estimates for the Carter Administration
Alternate Specifications of "Honey"
(t-statistics in parentheses)

	1	2
Intercept	12.06 (2.02)	15.17 (2.36)
Y_{-1}	0.77 (8.54)	0.71 (7.21)
P^e	-0.02 (-1.17)	-0.01 (-0.56)
U^e		
6-month trend honey	1.40 (1.12)	
12-month binary honey		5.47 (1.64)
Adjusted R^2	0.80	0.81
Durbin's h	1.889	2.286
Standard Error	5.28	5.19
Log of Likelihood Ftn.	-139.24	-138.38

Table 3.10
Estimates for the Reagan Administration
Alternate Specifications of "Honey"
(t-statistics in parentheses)

	1	2	3
Intercept	49.84 (8.39)	43.62 (7.34)	47.68 (7.12)
Y_{-1}	0.37 (5.01)	0.46 (6.13)	0.40 (4.80)
P^2	-0.07 (-4.46)	-0.04 (-3.22)	-0.05 (-2.27)
U^2	-0.22 (-7.32)	-0.20 (6.51)	-0.21 (-6.55)
Iran	-10.11 (-7.25)	-9.13 (-6.42)	-9.79 (-6.38)
Honey	1.01 (4.41)		
6-month trend honey		1.68 (3.58)	
12-month binary honey			4.58 (1.91)
Adjusted R^2	0.89	0.88	0.87
Durbin's h	1.512	1.029	3.224
Standard Error	2.60	2.69	2.83
Log of Likelihood Ftn.	-210.73	-213.70	-218.19

Table 3.11
Estimates for the Reagan Administration
Alternate Specifications of "Iran"
(t-statistics in parentheses)

	1	2	3	4
Intercept	20.14 (4.97)	31.88 (6.83)	22.28 (5.35)	48.80 (8.14)
Y_{-1}	0.72 (12.33)	0.58 (9.14)	0.69 (11.71)	0.39 (5.13)
P^2	-0.05 (-2.88)	-0.06 (-9.14)	-0.05 (-3.03)	-0.07 (-4.55)
U^2	-0.06 (-3.24)	-0.12 (-5.37)	-0.07 (-3.67)	-0.21 (-6.98)
Honey	0.89 (3.31)	0.99 (3.98)	0.91 (3.44)	1.03 (4.50)
Iran 2	-4.74 (-3.81)			
Iran 3		-7.60 (-5.74)		
Iran 4			-5.38 (4.23)	
Pre-Gap Iran				-10.64 (-7.29)
Post-Gap Iran				-9.22 (-5.84)
Adjusted R^2	0.84	0.87	0.85	0.89
Durbin's h	0.176	0.339	0.058	1.273
Standard Error	3.06	2.81	3.02	2.60
Log of Likelihood Ftn.	-225.45	-217.73	-223.97	-209.97

Table 3.12
dP/dU for Alternate Combinations of P and U
Reagan Administration

P \ U	11%	10%	9%	8%	7%	6%
13%	-2.69	-2.45	-2.20	-1.96	-1.71	-1.47
12%	-2.92	-2.65	-2.39	-2.12	-1.86	-1.59
11%	-3.18	-2.89	-2.60	-2.31	-2.02	-1.74
10%	-3.50	-3.18	-2.86	-2.55	-2.23	-1.91
9%	-3.89	-3.54	-3.18	-2.83	-2.47	-2.12
8%	-4.38	-3.98	-3.58	-3.18	-2.78	-2.39
7%	-5.00	-4.55	-4.09	-3.64	-3.18	-2.73
6%	-5.83	-5.30	-4.77	-4.24	-3.71	-3.18
5%	-7.00	-6.36	-5.73	-5.09	-4.45	-3.82
4%	-8.75	-7.96	-7.16	-6.36	-5.57	-4.77
3%	-11.67	-10.61	-9.55	-8.49	-7.42	-6.36
2%	-17.50	-15.91	-14.32	-12.73	-11.14	-9.55
1%	-35.00	-31.82	-28.64	-25.47	-22.27	-19.09

Table 3.13
Eisenhower and Nixon-Ford Estimation
(t-statistics in parentheses)

α_0 - Eisenhower constant	74.32 (24.37)
β_0 - Nixon-Ford differential	-11.27 (-3.07)
α_1 - Eisenhower P^e	-0.72 (-2.85)
β_1 - Nixon-Ford differential	0.65 (2.57)
α_2 - Eisenhower U^e	-0.30 (-2.93)
β_2 - Nixon-Ford differential	0.10 (0.92)
α_3 - Eisenhower Honey	0.09 (0.37)
β_3 - Nixon-Ford differential	0.14 (0.46)
β_4 - Nixon-Ford Water	-13.65 (-8.15)
δ - Eisenhower adjustment	0.39 (4.34)
c - Nixon-Ford differential	0.46 (1.22)

Adjusted R^2 = 0.91
Standard Error of the Regression = 3.75
Log of Likelihood Function = -465.68
Durbin m-statistic = 0.41

Table 3.14
Nixon-Ford and Reagan Estimation
(t-statistics in parentheses)

α_0 - Reagan Intercept	79.66 (34.06)
β_0 - Nixon-Ford differential	-16.62 (-5.57)
α_1 - Reagan P^e	-0.11 (-3.47)
β_1 - Nixon-Ford differential	0.04 (1.07)
α_2 - Reagan U^e	-0.35 (-10.89)
β_2 - Nixon-Ford differential	0.15 (2.76)
α_3 - Reagan Honey	1.01 (3.37)
β_3 - Nixon-Ford differential	-0.78 (-2.21)
α_4 - Reagan Iran	-10.11 (-5.55)
β_4 - Nixon-Ford Water	-13.65 (-8.99)
δ - Reagan adjustment	0.63 (6.40)
c - Nixon-Ford differential	-0.88 (-0.52)

Adjusted R^2 = 0.889
Standard Error of the Regression = 3.40
Log of Likelihood Function = -453.71
Durbin m_5-statistic = 1.13

Figure 3.1
Social Preference Curves for Eisenhower

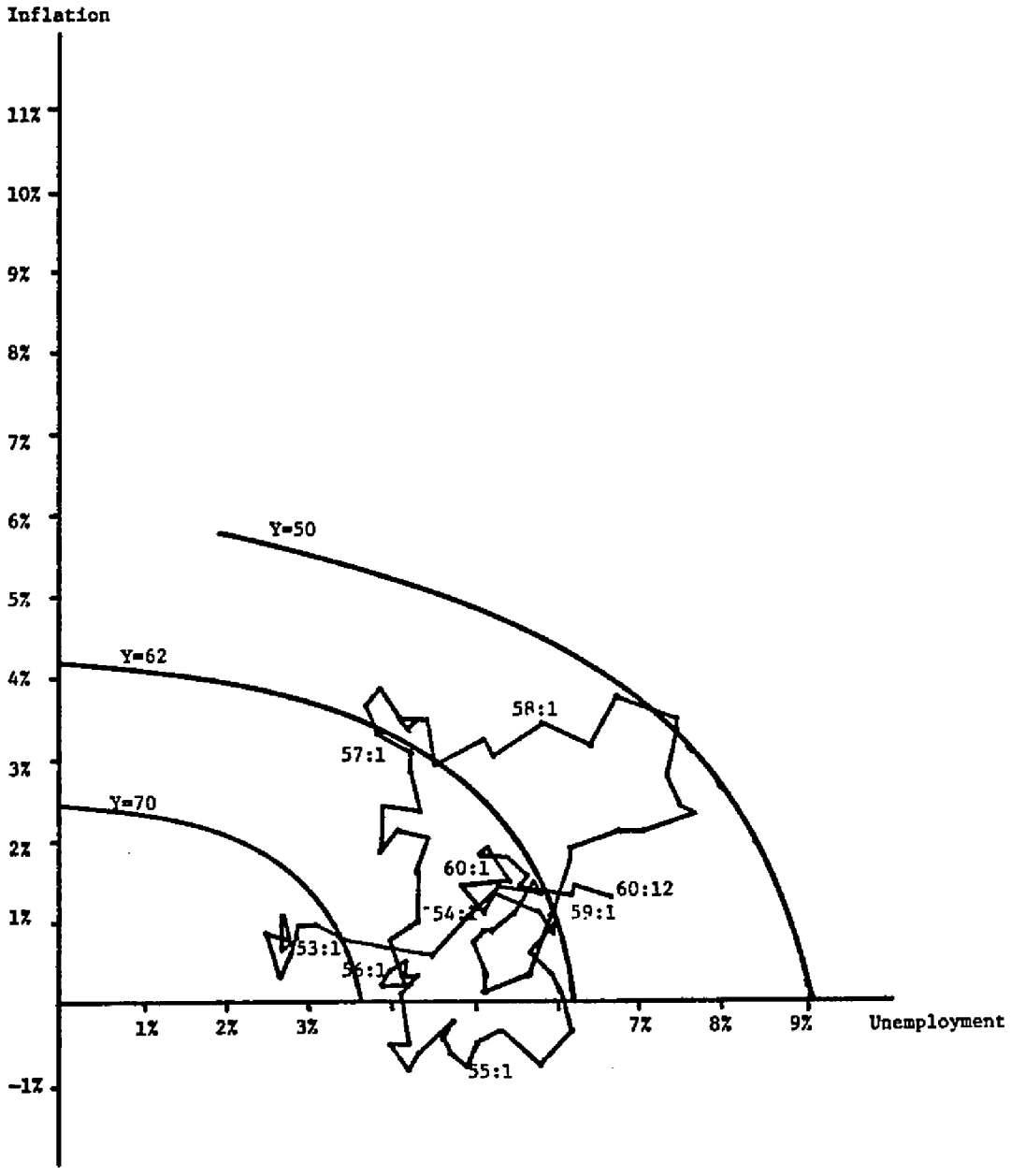


Figure 3.2
Social Preference Curves for Nixon-Ford

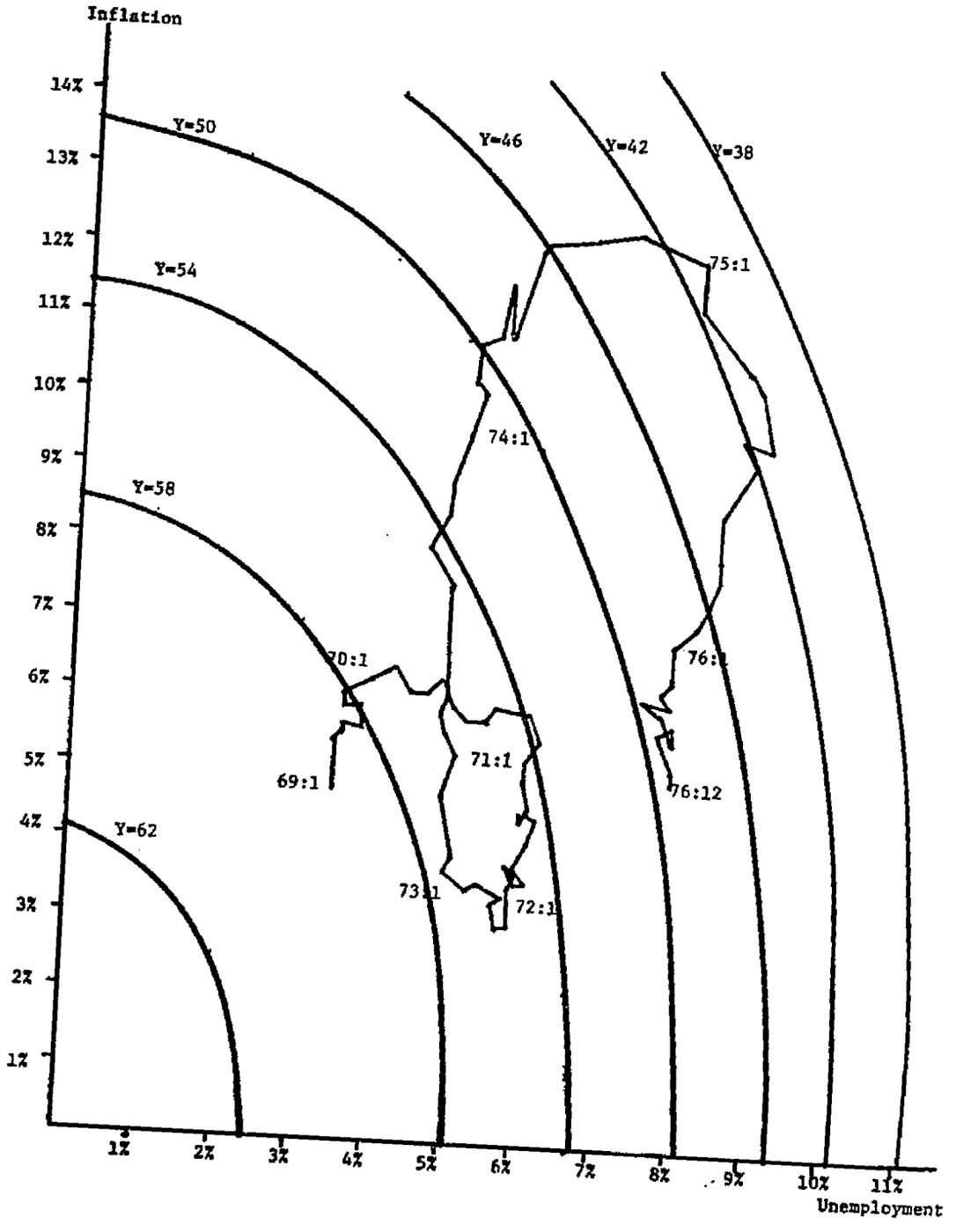


Figure 3.3
Social Preference Curves for Reagan

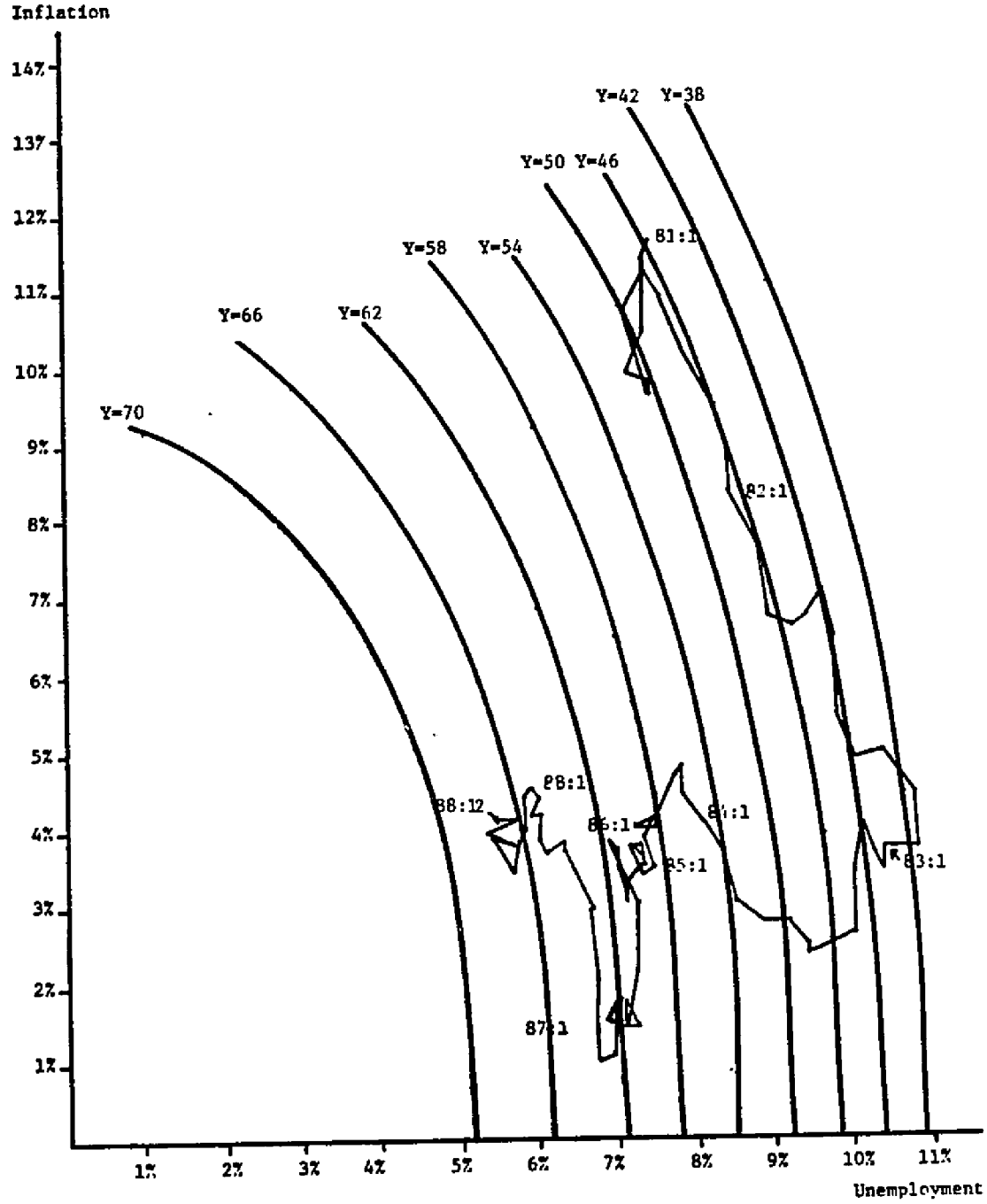


Figure 3.4
Social Preference Curves for Republican Regimes
50% Popularity

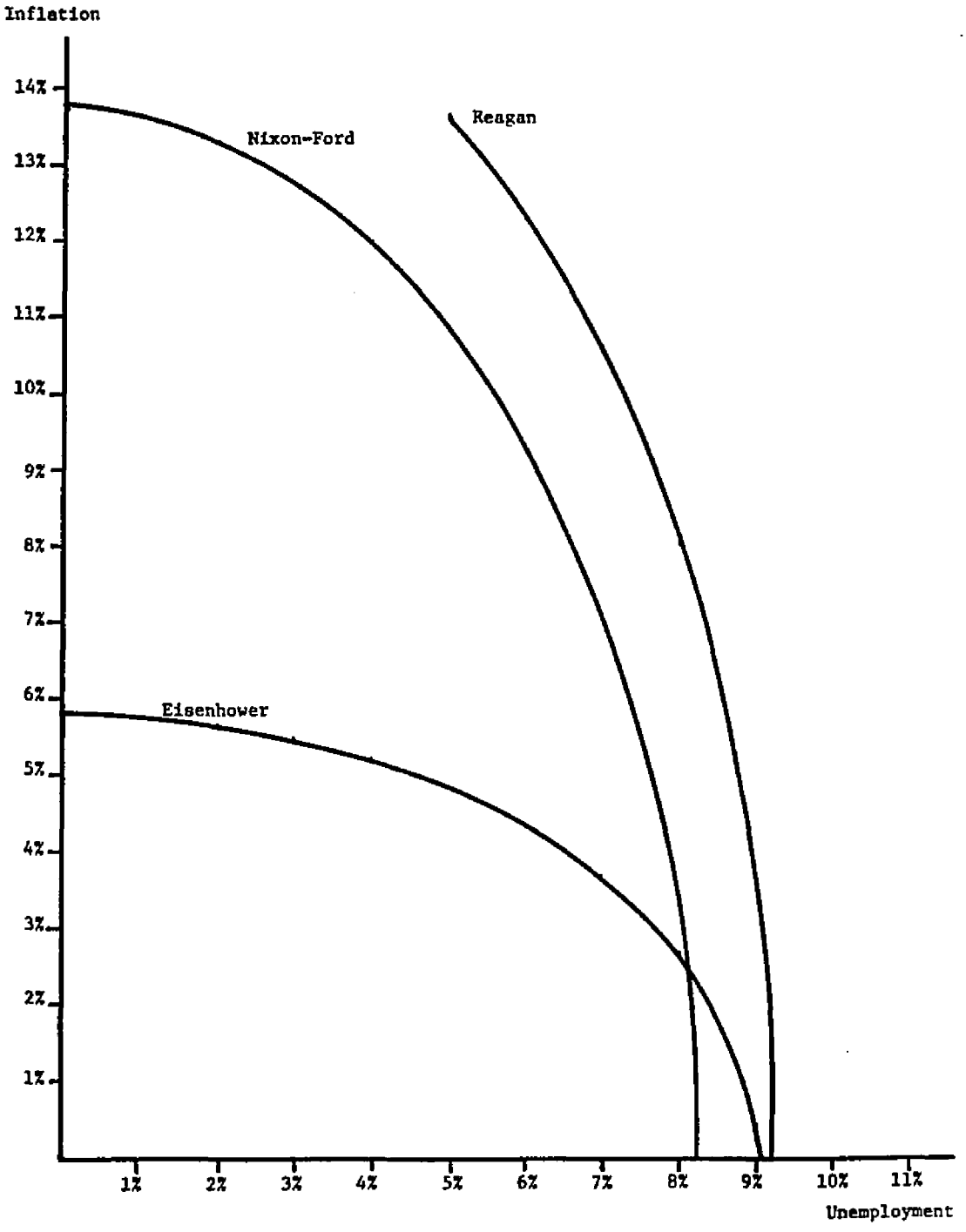


Figure 3.5
Social Preference Curves for Republican Regimes
55% Popularity

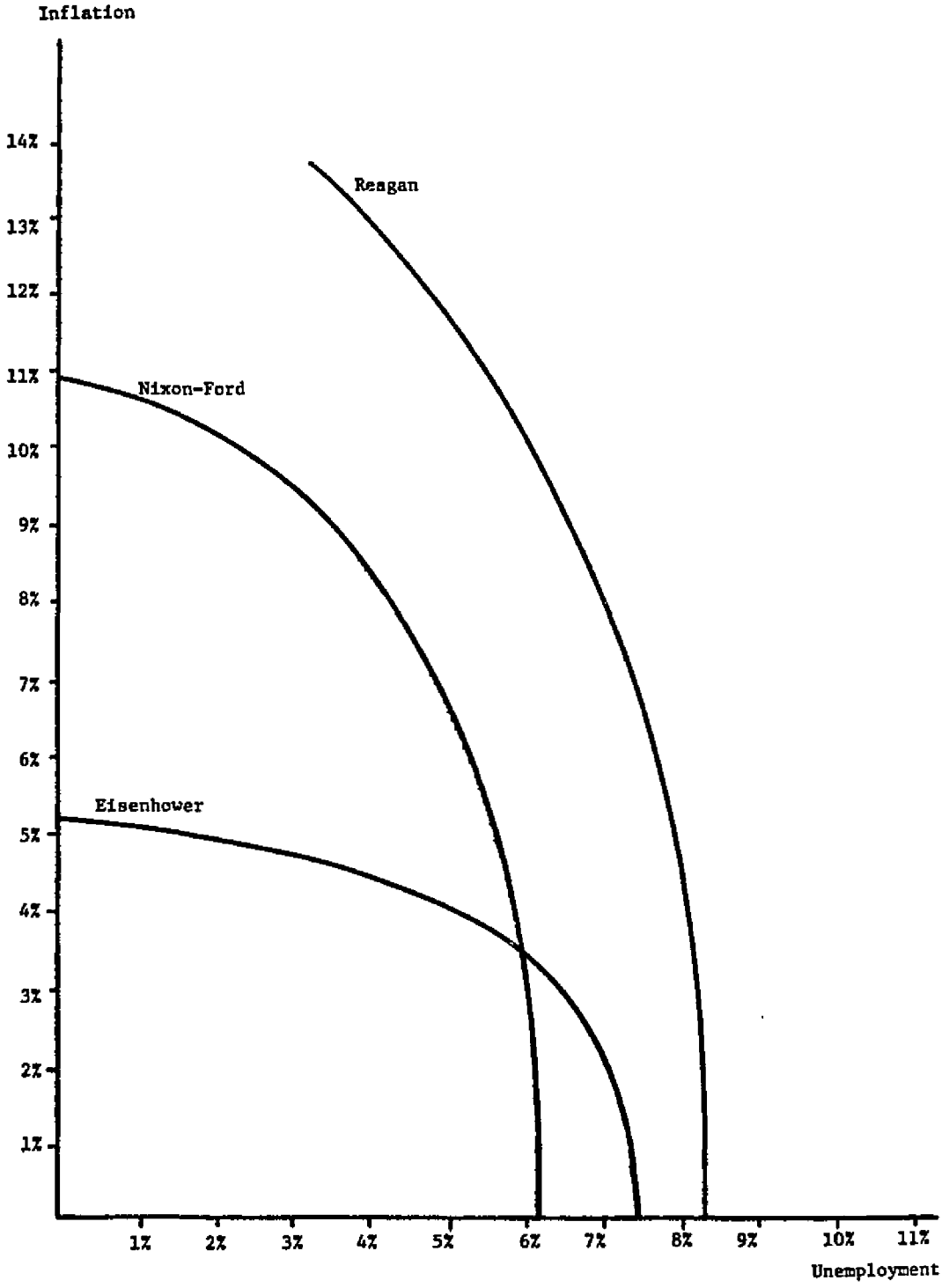
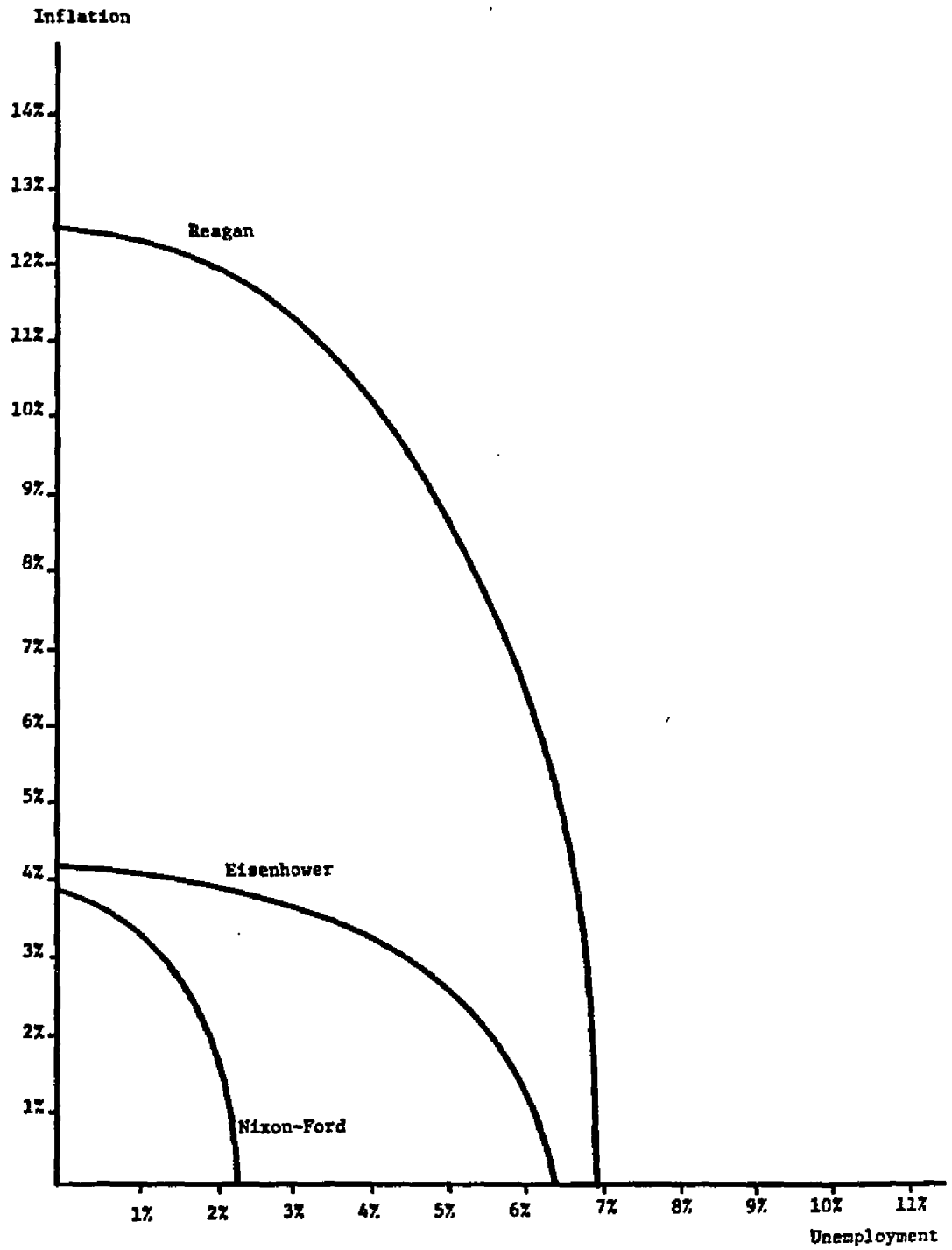


Figure 3.6
Social Preference Curves for Republican Regimes
62% Popularity



CHAPTER 4

Social Preferences, the Phillips Curve, and the Political Business Cycle

4.1 Introduction

Until the late 1960s or early 1970s most macroeconomists believed it possible to exploit a Phillips curve relationship to permanently lower unemployment at the expense of a higher permanent inflation rate or conversely, to permanently decrease inflation while accepting a permanently increased unemployment rate. The evidence of the 1970s and the works by Friedman (1968) and Phelps (1967) caused the concept to be replaced by a vertical long run Phillips curve and a downward sloping expectations augmented short run Phillips curve. This short-run curve could be exploited only until expectations were revised upwards.

The expectations-augmented short-run Phillips curve led to the development of political business cycle models such as those by Nordhaus (1975), MacRae (1977), Tufte (1978), and Barro and Gordon (1983). The usual scenario envisions an administration maximizing a quadratic popularity function subject to the constraint of the short-run Phillips curve by reducing unemployment, and consequently allowing the inflation rate to rise. In Figure 4.1, if we begin at Point A at the natural rate of unemployment, the administration would seek to move in a leftward direction along $P_{\$}$ to point

B, the highest possible popularity level. Following the election, as inflation expectations are revised upward, the economy returns to the natural rate of unemployment with a higher inflation rate and lower presidential popularity.[1] This is represented on Figure 4.1 by a shift in the Phillips curve to $P_{\frac{1}{2}}$ and the new long run equilibrium at point C.

Several empirical studies have attempted to see whether or not such a pattern is to be observed over an election cycle--for instance Frey and Schneider (1978) and Golden and Poterba (1980). Tufte (1978, 11) finds that 70% of the countries in his analysis experienced a political business cycle to some degree. He also provides specific evidence of the cycle occurring in United States post-war history.

Though these works attest to the presence of a cycle, we have seen no empirical evidence to date which explores whether or not there are worthwhile gains to be achieved in terms of increased popularity from exploiting the short-run Phillips curve relationship. The extent of the popularity gains will obviously depend upon the slope of the indifference curve derived from the public's social preference function and the slope of the expectations

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[1]It should be noted that a president may have motivations other than winning a reelection campaign for maintaining a high popularity rating. His success in having his legislative agenda passed in Congress has been shown to depend in large part upon his personal popularity (see Ostrom and Simon (1985)). As the leader of his party, the President's popularity may affect the election hopes of party members to other governmental positions.

augmented Phillips curve. In addition, gains will also depend upon the speed with which inflation expectations are revised (thus how quickly the expectations-augmented Phillips curve will shift) and the extent to which the voting public can correctly guess the policy objectives of the administration.

If we assume that inflation expectations adjust quite rapidly or that the voting public accurately predicts the administration's policy objectives then the popularity gains from exploiting the short-run Phillips curve are zero. We believe, however, that intervention can affect short-run popularity, though the empirical evidence indicates that the gains are so small as to make the undertaking unappealing.

The remainder of this chapter is devoted to determining the popularity gains which could be possible from exploiting the Phillips curve relationship for each of the Republican presidencies. Since the macroeconomic coefficients in the social preference function for Kennedy-Johnson and Carter presented in Chapters 2 and 3 are insignificant, we cannot examine in a meaningful manner popularity gains for these administrations. Section 4.2 provides a brief discussion of the Phillips curve. Sections 4.3-4.5 give the estimated Phillips curves and popularity gains for each of the Republican administrations. Finally, comparisons between the three administrations and conclusions are given in section 4.6.

4.2 The Expectations-Augmented Phillips Curve

Most analyses of dynamic inflationary behavior typically assume that the rate of inflation along a given short-run Phillips curve is determined by the differential between the observed unemployment rate and the natural rate as follows:

$$P = f(U - U^*) \tag{4.1}$$

where P and U are the inflation and actual unemployment rates and U^* is the the natural rate of unemployment so that $U - U^*$ is the deviation from the natural rate. The difference between one short-run Phillips curve and another is the expected rate of inflation. Accordingly, we form an "expectations augmented" Phillips curve by modifying equation 4.1 to include the expected rate of inflation:

$$P = f(U - U^*) + P^e \tag{4.2}$$

This relationship implies that the unemployment rate may be below (above) the natural rate only as long as the actual rate of inflation exceeds (lags behind) the expected rate of inflation. When $P = P^e$, wages rise as rapidly as

prices, U must equal U^*, and we are then on the long-run Phillips curve.[8]

It is obvious from equation 4.2 that one of the driving forces in Phillips curve behavior is the expected rate of inflation, yet there is much debate concerning the way in which expectations are formed. The simplest idea and the one which most readily lends itself to empirical estimation is to assume that P^e depends upon past inflation and thus $P^e=P_{-1}$. It is this expectations scheme which we adopt in the empirical work which follows.

4.3 Popularity Maximization for the Reagan Administration

Within this section, we first estimate a short-run expectations augmented Phillips curve for the Reagan administration. Next, we develop mathematically the formulas for generating gains in popularity which will be used for the Reagan, Nixon-Ford, and Eisenhower regimes. Finally, we discuss the actual gains in popularity which Reagan could achieve by the generation of a political business cycle.

4.3.1 The Reagan Phillips Curve

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[8]See Dernburg (1985, 296-302) and Branson (1989, 495-515) for a general discussion of the Phillips curve relationship. Gordon (1976) provides a nice discussion of the development of Phillips curve theory.

We modify equation 4.2 for the Reagan administration to yield an expectations augmented Phillips curve of the following form

$$P - P^{e} = k(U - U^{*}) + nP^{n} + \delta \qquad (4.3)$$

$$k < 0 \quad n > 0$$

In addition to the variables introduced earlier, P^{n} is the rate of inflation of energy prices. The unexpected rate of inflation is $P - P^{e}$. We include the rate of inflation of energy prices because if there is an unexpected increase (decrease) in inflation because of an increase (decrease) in energy prices this will not greatly benefit (harm) domestic unemployment because much of the benefit (loss) accrues to foreign firms.

We estimate the expectations augmented Phillips curve in equation 4.3 using annual data for the period 1977 to 1988. We use annual data because a lag of this length allows the short-run Phillips curve to generate a potentially significant fall in unemployment. Unexpected inflation is measured by the difference between the inflation rate in the current year and the previous year, so that $P - P^{e} = P - P_{-1}$. We tried alternative measures of expected inflation based upon the Livingston and University of Michigan Survey Research Center data without obtaining superior results and so present the simpler and more readily

interpretable formulation here. We also estimated the short-run Phillips curve over a longer time period and both with and without time trends and energy prices. Our estimates of k and U* are remarkably robust over all the alternative specifications.

Table 4.1 reports the estimations of equation 4.3. All coefficients are significant at the 99% confidence level and the Durbin Watson coefficient indicates no serial correlation at the 95% confidence level. The slope of the short-run Phillips curve is given by k = -1.29 and the natural rate of unemployment, U*, is 6.73.[9]

4.3.2 Popularity Maximization Using the Short-Run Phillips Curve

For any particular short-run Phillips curve presidential popularity is maximized at the tangency position between that particular short-run expectations augmented Phillips curve and the indifference curve. The slope of the short-run Phillips curve is k and that of the equilibrium indifference curve (from Chapters 2 and 3) is

$$dP/dU = -(\tau_2/\tau_1)U/P \qquad (4.4)$$

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[9]This estimated natural rate of unemployment is slightly larger than Gordon's (1987) estimate of 6% for the Reagan years. However, a lower natural rate of unemployment would lessen the gains from exploiting the Phillips curve tradeoff.

where τ_1 and τ_E represent the equilibrium coefficients of inflation and unemployment respectively. Equating these and rearranging yields

$$P = -(\tau_E/\tau_1)U/k \qquad (4.5)$$

The tangency locus for the Reagan administration is graphed in Figure 4.2 together with the natural rate of unemployment. Unless the economy is already at a tangency position on the locus a movement along a short-run Phillips curve can increase Presidential popularity. Depending on whether the initial position is to the right or the left of the locus increasing popularity will involve moving up or down the short-run Phillips curve. In the first case, the short-run Phillips curve is flatter than the relevant indifference curves and popularity is increased by a short-run lowering of unemployment at the expense of increased inflation. In the second case, the short-run Phillips curve is steeper than the relevant indifference curves and popularity is increased by lowering inflation at the expense of increased unemployment.

How big an increase in popularity is it possible for an administration to generate? For simplicity we shall suppose that the economy is initially in equilibrium on the vertical long-run Phillips curve at the natural rate of unemployment so that the actual and expected inflation rates are equal.

We make this assumption so that we can concentrate on an administration-caused move along the short-run Phillips curve without having to disentangle this movement from shifts in the short-run Phillips curve which would necessarily occur if unemployment is not initially at the natural rate.

To estimate how large an effect the administration can have on popularity by exploiting the short-run Phillips curve it is necessary to derive the locus of values of unemployment and inflation for any particular value of expected inflation. In the following we assume that the rate of inflation of energy prices is zero, $P^n = 0$. Since the average annual energy inflation rate was 0.7% over the Reagan years, this assumption is not unreasonable. We also assume that the disturbance term is zero, $\delta = 0$.

Recall that the presidential popularity function estimated for the Reagan administration was

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 P^e + \beta_3 U^e + \beta_4 \text{Iran} + \beta_5 \text{Honey} \qquad (4.6)$$

We make the estimates assuming a time span after the end of the honeymoon period and before the Iran-Contra affair; thus, we set H = I = 0. We estimate the popularity maximizing combinations of the rates of unemployment and inflation one year hence using the equilibrium estimates of the indifference map (that is, assuming that adjustment is

complete, $Y = Y_{-1}$, and assuming that there is no change in the expected rate of inflation). If we allow $\tau_1 = \beta_0/(1-\beta_1)$, $\tau_2 = \beta_2/(1-\beta_1)$, and $\tau_3 = \beta_3/(1-\beta_1)$ then the social preference function is reduced to

$$Y = \tau_0 + \tau_1 P^e + \tau_2 U^e \tag{4.7}$$

Combining the expression for the tangency position in equation 4.5 with the short-run Phillips curve in equation 4.3 yields the following presidential popularity maximizing unemployment and inflation rates

$$U = k\tau_1(kU^* - P^*)/(k^e\tau_1 + \tau_2), \tag{4.8}$$

$$P = -\tau_2(kU^* - P^*)/(k^e\tau_1 + \tau_2) \tag{4.9}$$

Substituting these values of U and P into equation 4.7 and simplifying gives the popularity maximizing level, Y_{max},

$$Y_{max} = \tau_0 + \tau_1\tau_2(kU^* - P^*)^2/(k^e\tau_1 + \tau_2) \tag{4.10}$$

Making the same assumptions as before and substituting U^* for U and P^* for P in equation 4.7 yields the pre-policy popularity rates, Y_{net}, at the natural rate of unemployment given by

$$Y_{nat} = \tau_0 + \tau_1 P^{e2} + \tau_2 U^{*2} \qquad (4.11)$$

Then the increase in presidential popularity, Y_{inc}, is the difference between Y_{max} and Y_{nat} and is given by

$$\begin{aligned} Y_{inc} &= Y_{max} - Y_{nat} \\ &= -(k\tau_1 P^e + \tau_2 U^*)^2/(k^2\tau_1 + \tau_2) \end{aligned} \qquad (4.12)$$

The appropriate estimated values of τ_0, τ_1 and τ_2, found in equation 3.9, are 79.66, -0.11 and -0.35 respectively. The slope of the Phillips curve, k, is -1.29 and U^* is 6.73. Table 4.2 employs these values and alternative values of expected inflation to yield the levels of presidential popularity at the natural rate of unemployment, Y_{nat}, at the popularity maximizing rates of inflation and unemployment, Y_{max}, and the difference between the two, Y_{inc}.

The gains from moving up the short-run Phillips curve are greatest when the expected rate of inflation is low; they are much less if we start from a higher expected rate of inflation. Low inflation rate ranges are not likely to be very relevant for popularity maximizing policy attempts. First, if the inflation rate is low then presidential popularity is already high and there is no need to embark on a popularity increasing expedition up the short-run Phillips curve. Secondly, it is not likely that an administration

will have much opportunity to start from low inflation rates -- in only one of the past twenty years, 1986, has the annual rate of inflation been substantially below four percent and that was as the result of a favorable energy price shock. Thus we need to concentrate on the gains that can be achieved when inflation rates are above four percent.

If the initial equilibrium inflation rate is five percent then popularity maximizing will increase popularity by about five percentage points. As the assumed initial rate of inflation increases the gains decline quite rapidly -- declining to zero with an initial inflation rate of 16 percent. At higher initial inflation rates popularity can be increased by moving down a short-run Phillips curve, reducing inflation and increasing unemployment.

With realistic inflation rates the increase in popularity of a few percentage points is not very substantial particularly if one bears in mind that the standard error of the estimated social welfare function is 2.6 percentage points. Moreover, there are a number of reasons for believing that our estimates are on the high side and that the actual increase that an administration can achieve is likely to be significantly less than the Table 4.2 estimates.

First, the calculations have been made on the assumption that price expectations are unchanged for a year. If rising inflation causes inflation expectations to

increase before a year is over then the short-run Phillips curve will move upwards, the actual rate of inflation will be increased, and so the gains in popularity will be reduced.

Second, if agents in the economy correctly predict the policy objectives of the administration then expected inflation will increase and again the short-run Phillips curve will shift upwards.

Third, it will take some time for an administration to affect the inflation-unemployment mix and it may not be possible to move to the maximization position within a year.

Fourth, the equilibrium indifference curves have been used for the calculations. We have seen that the public adjusts its presidential ratings to macroeconomic changes quite speedily but as the inflation-unemployment mix will be continually changing, adjustment of the popularity function may not be complete within a year so that popularity may not have increased to the equilibrium levels given in Table 4.2.

Fifth, we have assumed that the short-run Phillips curves are linear between inflation and the unemployment rate. If non-linearity is present at low unemployment rates so that the short-run Phillips curves is convex to the origin then by incorrectly using a linear relation we shall underestimate the popularity maximizing inflation rate, overestimate Y_{max} and overestimate Y_{inc}. We tested to see if the short-run Phillips relationship was non-linear and

found no evidence of non-linearity but as we have few low unemployment observations we cannot be sure that non-linearity is not present.

Sixth, the calculations suppose that the administration is able to direct its policy so as to achieve the tangency position. We doubt that politicians are sufficiently adept at precisely manipulating economic variables especially given the United States political structure in which economic power is divided between the President, the Congress and the Chairman of the Federal Reserve Board.

We conclude that while it is theoretically possible for an administration to increase presidential popularity by moving up the short-run Phillips curve, the gains achieved are unlikely to be very substantial or very certain.

4.4 Popularity Maximization for the Nixon-Ford Administration

4.4.1 The Nixon Political Business Cycle Activity

Of all presidents in post-war history, perhaps Richard Nixon was most concerned with the effects of economic prosperity on his re-election possibilities in the 1972 election. Tufte (1980, 45-55) delineates the efforts undertaken in both fiscal and monetary actions which contributed to a booming pre-election economy. Social security benefits increased by 20 percent in October, 1972 financed by a post-election increase in contributions. In

fact, almost every type of transfer accelerated in late 1972 and declined after the election. Veteran's benefits and federal grants in aid to state and local governments also increased substantially as election day drew near.

To a certain extent one may say that Nixon's efforts were rewarded by the November victory. Was this victory due to the economic manipulation or to other factors? Our analysis of popularity gains from the exploitation of the short-run Phillips curve will yield some insight. As with the Reagan administration, we develop a short-run expectations augmented Phillips curve for Nixon-Ford and analyze the popularity increases resulting from its exploitation.

4.4.2 The Phillips Curve for the Nixon-Ford Years

Just as the political sphere was in flux during much of the Nixon-Ford administration, the economic realm was in a state of turmoil during these years as well. The oil price shocks accompanied by a variety of other factors caused many economists to feel as if the traditional Phillips curve relationship had altogether collapsed; other economists explained the observed simultaneous increases in inflation and unemployment as a series of rightward shifts in the curve. It is this view which we adopt.

Because of these changes, we estimate the Phillips curve relation in equation 4.3 over a relatively short time

period, 1967-1977. The results are presented in Table 4.3. The slope of the curve, -1.06, is somewhat smaller in absolute terms than that for the Reagan years. The natural rate of unemployment, assuming zero energy inflation, is 4.28 percent, again lower than for the Reagan years. Though the Durbin h-statistic is a bit high, the negative serial correlation causes the t-statistics to be understated rather than biased upward. As with the Reagan Phillips relationship, we estimated several other specifications--nonlinear, including and excluding time trends, using other measures of expected inflation--and found this specification to be as good as or superior to any of the other formulations.

4.4.3 Popularity Maximization for the Nixon-Ford Regime

The popularity maximizing values for the Nixon-Ford administration may be found by substituting the values of k, U^*, τ_0, τ_1, and τ_E[4] relevant to this regime into equations 4.10, 4.11, and 4.12. We initially assume, as with the Reagan administration, that energy inflation is zero. The resulting gains are presented in Table 4.4.

The gains from exploiting the short-run Phillips curve are very small. At five percent expected inflation, for example, popularity at the natural rate is 57.81 points as

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[4]The equilibrium values for τ_0, τ_1 and τ_E are 63.04, -0.07 and -0.19 respectively and are found in equation 3.6.

compared to a maximum popularity of 58.54, an increase in popularity of only 0.73 percentage points. These increases decline to zero at an initial expected inflation rate of 11 percent. The positive increases in popularity above 11 percent expected inflation come as a result of "reverse" business cycle activity: decreasing inflation at the expense of higher unemployment. From these estimates, Nixon's efforts at increasing his reelection opportunities by economic manipulation were not very fruitful.

One may argue that due to increasing energy prices during the Nixon-Ford regime the natural rate of unemployment was much higher than our estimated rate. Thus our estimates of possible popularity increases are low because they are based on a natural rate of unemployment dependent upon zero energy inflation rates. Table 4.5 presents the gains in popularity if we assume 3 percent energy inflation, the average rate during Nixon's first term. The resultant natural rate of unemployment is 4.93 percent. These figures indicate that while popularity gains are indeed larger than those presented in Table 4.4, they are still quite small, so small as to make the generation of political business cycles unattractive.

The large increases in energy prices occurred in the second Nixon-Ford term; the average annual energy inflation rate for 1973-1976 was 13 percent. Table 4.5 also presents the popularity gains possible if we assume the natural rate

of unemployment is 7.26 percent, the rate consistent with 13 percent energy inflation. Two points are noteworthy. First, the gains in popularity when the natural rate of unemployment is high are much larger than when the natural rate is lower. Second, the increase in popularity gains associated with increases in energy inflation rates (and thus the natural rate of unemployment) are not equal in magnitude at different rates of expected inflation. For example, at 5% expected inflation the increases in popularity associated with 3% and 13% energy inflation are 1.19 and 3.78 points respectively, a change of 2.9 points. If we assume initial expected inflation of 10% the increases in popularity possible at 3% and 13% energy inflation rates are .14 and 1.47 points respectively, a change of only 1.33 points.

Tufte (1978) documents that Nixon was extremely concerned with the possible election outcomes associated with a depressed economy. As a result of these fears, Nixon's pre-election economic policies followed "textbook" political business cycle patterns: large increases in spending and possibly manipulation of the money supply to create economic prosperity and thus to ensure re-election. Though overall economic prosperity may have contributed to his November, 1972, victory our analysis indicates that

Nixon's economic machinations did not substantially increase his popularity.[5]

4.5 Popularity Maximization for the Eisenhower Administration

In estimating the inflation-unemployment tradeoff for Eisenhower we modify equation 4.3 by excluding the energy inflation rate. Energy inflation was not deemed a serious problem prior to the 1970s and so we do not include it in our regression analysis. We estimate the Phillips curve relationship using yearly data from 1954 to 1969. Data previous to 1954 is somewhat distorted by the effects of the Korean conflict and wage price controls. 1969 roughly corresponds to the beginning of rising inflation rates.

Table 4.6 presents the results of our estimation. All coefficients are statistically significant and the Durbin-Watson statistic indicates no presence of serially correlated errors. The slope of this Phillips curve is much flatter than that for the corresponding Reagan and Nixon-Ford curves.

These results are far from optimal. None of the other specifications we examined provided markedly better results, however. In preliminary estimation we explored different measures of inflation, used the actual rate of inflation

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[5]We feel that our actual estimates of gains in popularity for the Nixon-Ford term are biased upward for the same reasons as listed in section 4.3.2.

rather than the unexpected rate as the dependent variable, and tried nonlinear rather than linear formulations. For varying reasons, each of these specifications was unsatisfactory as well. As a result we present this formulation because although a large portion of the error variance is unaccounted for by the model it is consistent with the functional form adopted in the Reagan and Nixon-Ford analyses.

A possible reason for the poor performance of the Phillips curve is that there was a small variance in inflation over the time period. In the actual years of the Eisenhwoer term, for example, inflation's maximum value was 3.83 percent and its minimum value was -0.87 percent. This meant a very small variation in P^e as well.[6]

We substitute the values of k and U^* as well as the values of τ_1 and τ_2[7] into equations 4.10, 4.11, and 4.12 to obtain Eisenhower's popularity at the natural rate of unemployment and at the maximizing level and the increase in popularity. These calculations are presented in Table 4.7.

An interesting feature of these results is that the increases in popularity first decline and then increase as

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[6]We regressed P on P_{-1} and unemployment in preliminary research. The coefficient of P_{-1} was not significantly different from one justifying our use of $P - P^e$ as the dependent variable.

[7]These values are found in equation 3.2 The equilibrium intercept, inflation, and unemployment values are 74.31, -0.72, and -0.30.

expected inflation rises. This phenomena may be explained through the use of Figure 4.1. If we initially begin at point A at U* along P_{E_0} ($<P_T$), increases in popularity may be obtained by decreasing unemployment and allowing inflation to rise, causing a move to point B. Gains in popularity from this political business cycle behavior would persist for any Phillips curve between P_{E_0} and P_T. If we begin at point C, gains in popularity are zero as we are already at the popularity maximizing level consistent with P_T. Finally, assume we begin at point E at U* along P_{E_1} ($>P_T$). Popularity maximizing behavior would require actions to decrease inflation while allowing unemployment to rise until point D is reached. The behavior patterns for the Eisenhower administration would also be seen for the other administrations if we considered Phillips curves consistent with sufficiently high expected inflation rates.

As the Y_{Ins} column indicates, the gains from exploiting the Phillips curve are very small for the Eisenhower term, confirming our findings for the other two Republican regimes. These results are quite tenuous, however, due to our lack of real confidence in the estimated Phillips curve.

4.6 Chapter Summary

This chapter has developed a framework from which we may determine the increases in popularity afforded a president by undertaking political business cycle

activities. We have applied this structure to data for the Reagan, Nixon-Ford, and Eisenhower administrations. Though our results for the Eisenhower administration are weak, the conclusions drawn from the more recent Reagan and Nixon-Ford administrations are quite strong.

We have shown that an administration cannot generate substantial short-run increases in popularity by exploiting a short-run expectations augmented Phillips curve. Though the Nixon administration undertook to stimulate the economy before the 1972 presidential election, our results indicate that his actual popularity gains from undertaking this action were quite small. This evidence indicates that informed administrations will not find it worthwhile to create political business cycles.

Table 4.1
Expectations Augmented Phillips Curve Estimates, 1977-1988
Reagan Administration
(t-statistics in parentheses)

Coefficient	Estimate
k	-1.29 (-4.62)
U^*	6.73 (19.10)
n	0.07 (2.31)
Adjusted R^2	0.67
D-W statistic	1.97

Table 4.2
Presidential Popularity
with Alternative Rates of Expected Inflation
Reagan Administration

P^e	Y_{max}	Y_{max}	Y_{inc}
12%	47.97	48.78	0.81
11%	50.50	51.69	1.19
10%	52.81	54.46	1.65
9%	54.90	57.09	2.19
8%	56.77	59.67	2.90
7%	58.42	61.90	3.48
6%	59.85	64.10	4.25
5%	61.06	66.14	5.08
4%	62.05	68.05	6.00
3%	62.82	69.81	6.99
2%	63.37	71.42	8.05
1%	63.70	72.89	9.19
0%	63.81	74.22	10.41

Table 4.3
Expectations Augmented Phillips Curve Estimates, 1967-1977
Nixon-Ford Administration
(t-statistics in parentheses)

Coefficient	Estimate
k	-1.06 (-4.86)
U^*	4.28 (9.45)
n	0.23 (5.01)
Adjusted R^2	0.78
D-W statistic	2.55

Table 4.4
Presidential Popularity for the Nixon-Ford Administration
with Alternative Rates of Expected Inflation
Zero Energy Inflation Rate

P_e	Y_{min}	Y_{max}	Y_{inc}
13%	47.73	47.81	0.08
12%	49.48	49.50	0.02
11%	51.09	51.09	0.00
10%	52.56	52.58	0.02
9%	53.89	53.99	0.10
8%	55.08	55.26	0.18
7%	56.13	56.45	0.32
6%	57.04	57.54	0.50
5%	57.81	58.54	0.73
4%	58.58	59.43	0.85
3%	58.93	60.23	1.30
2%	59.28	60.92	1.64
1%	59.49	61.52	2.03
0%	59.56	62.02	2.46

Table 4.5
Presidential Popularity for Nixon-Ford Administration
with Alternative Rates of Expected Inflation
3% and 13% Energy Inflation Rates*

P^e	Y_{net}	Y_{max}	Y_{inc}
13%	46.59	46.59	0.00
	41.20	41.84	0.64
12%	48.34	48.35	0.01
	42.95	43.84	0.89
11%	49.95	50.01	0.06
	44.56	45.74	1.18
10%	51.42	51.56	0.14
	46.07	47.54	1.47
9%	52.75	53.02	0.27
	47.36	49.24	1.91
8%	53.94	54.38	0.44
	48.55	50.84	2.29
7%	54.99	55.64	0.65
	49.60	52.35	2.75
6%	55.90	56.80	0.90
	50.51	53.75	3.24
5%	56.67	57.86	1.19
	51.28	55.06	3.78
4%	57.30	58.83	1.53
	51.91	56.27	4.36
3%	57.79	59.69	1.90
	52.40	57.38	4.98
2%	58.14	60.46	2.32
	52.75	58.39	5.64
1%	58.35	61.12	2.77
	52.96	59.30	6.34
0%	58.42	61.69	3.27
	53.03	60.11	7.08

*The first number in each cell corresponds to 3% energy inflation; the second number corresponds to 13% energy inflation.

Table 4.6
Expectations Augmented Phillips Curve Estimates, 1954-1969
Eisenhower Administration
(t-statistics in parentheses)

Coefficient	Estimate
k	-0.64 (-2.97)
U^*	5.35 (14.30)
Adjusted R^2	0.34
D-W statistic	2.26

Table 4.7
Presidential Popularity
with Alternative Rates of Expected Inflation
Eisenhower Administration

P^e	Y_{net}	Y_{max}	Y_{inc}
7%	30.56	35.20	4.64
6%	39.91	42.33	4.42
5%	47.82	48.74	0.92
4%	54.29	54.55	0.15
3%	59.33	59.41	0.08
2%	62.92	63.68	0.69
1%	65.08	67.22	2.14
0%	65.09	70.05	4.96

Figure 4.1
Social Preference Functions and Phillips Curves

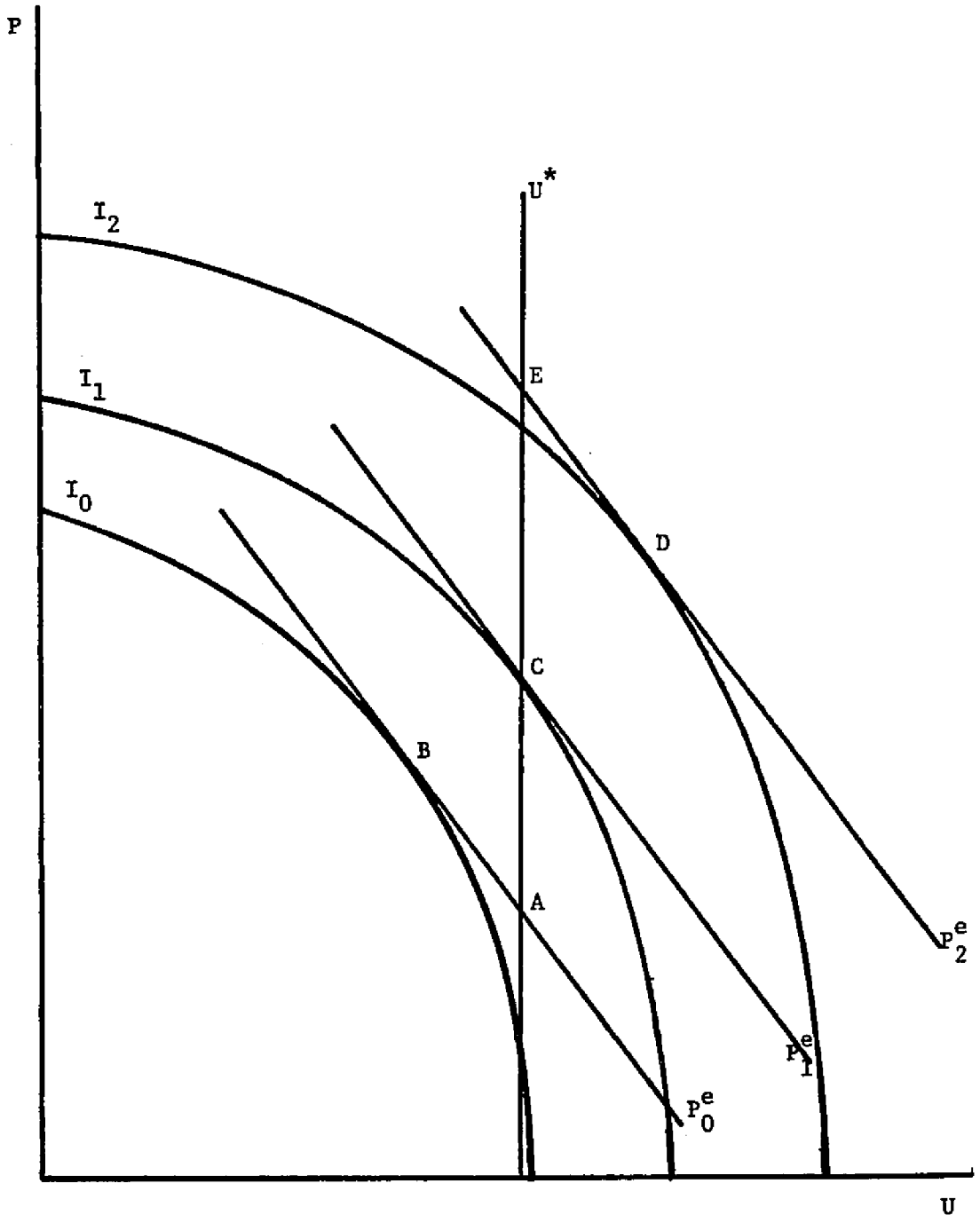
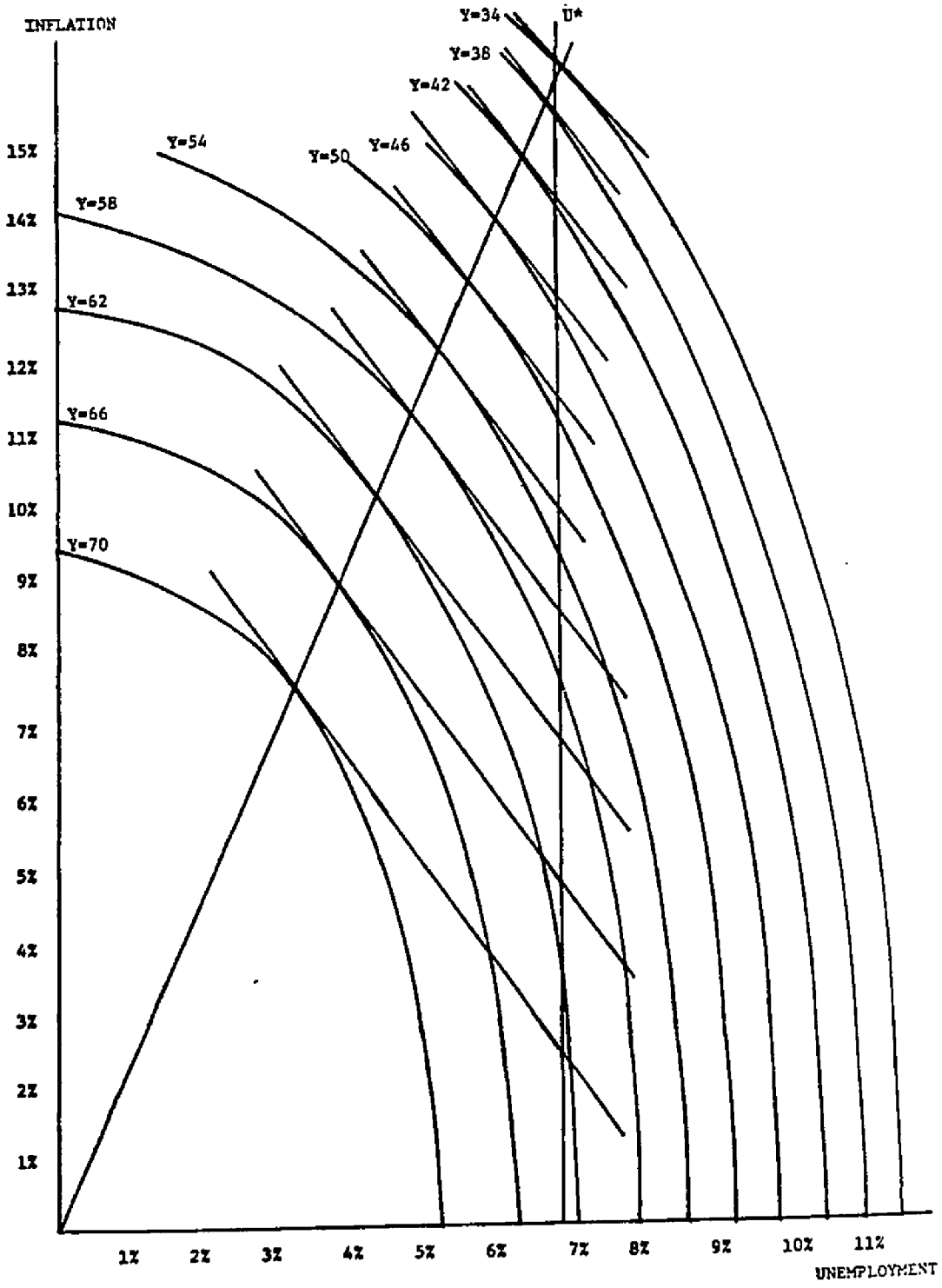


Figure 4.2
Popularity Maximization for Reagan



Chapter 5

A Disaggregated Model of Popularity

5.1 Introduction

Our study to this point has assumed that various sectors of the public respond in similar fashion to fluctuations in the economy. It is possible that there will be variances in approval ratings across groups in society, however, due to differences in objectives, interests, and partisan viewpoints of individuals. As Hibbs (1982, 326) states

> It is natural to expect political responses to macroeconomic performance to vary across groups because the burdens and rewards conferred by fluctuations in aggregate economic conditions are very unevenly distributed within the electorate.

Hibbs (1982), Chappell and Keech (1985a) and Monroe (1984) have examined popularity ratings disaggregated by occupational group, income, race, sex, and age. Hibbs (1982) employs a logit model to explain political support by occupational and partisan groups. His model regresses quarterly Gallup Poll data from 1961-1979 on unemployment, inflation, rate of change of real disposable income, number killed per quarter in Vietnam, a Watergate dummy, and a rally variable taken from Mueller (1970). He also accounts for the public's evaluation of performance relative to the President's predecessor's record and relative to his own

past performance. He reports substantial differences in macroeconomic perceptions along partisan lines, though does not present rigorous tests of this finding.

Chappell and Keech (1985) also examine popularity functions disaggregated by occupation, political party, and level of education within their "sophisticated" and "naive" models discussed in more detail in Chapter 1. Employing quarterly data for 1957:1-1980:4, they find in the "naive" model that Republicans punish inflation less and place more emphasis on output than do Democrats. There is no perceptable trend by level of education. The "sophisticated" model is far more difficult to interpret in these terms.

Monroe (1984) presents analyses for every classification made by the Gallup organization, employing bi-monthly data for 1965-1980. Her independent variables for each category include real disposable personal income, change in government expenditures on social welfare, and a stock market index in addition to inflation and unemployment rates. It is probable, therefore, that multicollinearity in the data has caused most of her coefficients to be statistically insignificant.

Though these pieces provide some useful information, the empirical work is flawed in the same manner as the current literature on the aggregate popularity function is

flawed. Since these are enumerated in detail in Chapter 1, only a brief summary is required here.

First, the estimated popularity functions include inflation and unemployment linearly, thus implying a linear tradeoff between the two macroeconomic variables in the public's social preference function. Second, the estimation ends with the Carter administration, providing no evidence for the Reagan years. Third, the estimation spans several presidential regimes without allowing for any change in perceptions toward inflation or unemployment.

In this chapter we explore presidential popularity functions disaggregated by race, sex, political party, and geographical region. In order to improve upon the current offerings, we estimate the function as a quadratic to allow the social preference function to be concave to the origin. Due to the evidence suggested in the aggregate model, each presidential administration is treated individually. We explore whether particular groups are more influenced by the unemployment rate relating specifically to them or to the overall unemployment rate. Finally, rigorous tests are conducted to determine if economic perceptions are significantly different across disaggregated groups.

5.2 The Data and the Model

The Gallup organization provides monthly presidential popularity data disaggregated into several subgroups. This

study will examine this data by race, by sex, by political party, and by geographical region. The dependent variable in each category is the percentage who responds "approve" to the Gallup Poll question "Do you approve or disapprove of the way Mr. _____ is handling the job of President?" The series are formed in the same manner as in the aggregate model presented in Chapter 2.

There are two classifications given by the Gallup organization for race: white and minority. These data are available on a consistent monthly basis for 1970:2-1984:12.[1] Though some observations exist previous to 1970, they are quite sparse. In addition, it is unfortunate that no disaggregated data on a monthly basis is available for the second Reagan administration. Thus all of our disaggregated analyses encompass only the first Reagan term.[2]

Data disaggregated by sex are available monthly for 1969:1-1984:12. Thus it is possible to estimate the entire

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[1] In preliminary research the macroeconomic coefficients for the Carter administration were statistically insignificant as in the aggregegate analysis. Because no new information is gained from these results and in order to conserve space the results for the Carter administration are presented only for the model disaggregated by political party.

[2] No interpolations are made for the following dates: 1970:6-1970:8, 1972:7, 1972:11, 1973:3-1973:5, 1974:8-1974:9, and 1976:7-1977:1. Gaps exist in the data for these periods. The Nixon-Ford administration is thus estimated from 1970:2-1976:6 exclusive of the periods listed above. The Reagan administration is estimated from 1981:2-1984:12.

Nixon-Ford administration as well as the first Reagan regime for men and women.[3]

Respondants to the Gallup survey are also classified as "Democrat," "Republican," or "Independent." For these purposes, those individuals identifying themselves with any party other than the two major parties are grouped as Independents. We estimate this time series data from 1969:2-1984:12.[4] We include the Carter term here in hopes of finding an explanation in partisan support for the insignificance of economic coefficients in Carter's aggregate model.

The last grouping we examine is classification by geographical region. The Gallup organization employs four regions: East, Midwest, South, and West.[5] The models disaggregated by region are estimated for Nixon-Ford and Reagan.[6]

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[3]Once more, the monthly observations are formed in the manner described in Chapter 2. Gaps in the data are left for the following time periods: 1970:6-1970:7, 1972:7-1972:10, 1973:3-1973:5, 1974:8, and 1976:7-1977:1.

[4]Gaps in the data are left for 1970:6-1970:7, 1972:7-1972:10, 1974:8, and 1976:6-1977:1.

[5]Those states classified as "east" are ME, NH, VT, MA, RI, CT, NY, NJ, PN, MD, DE, WV, and Washington D.C. The midwestern states are OH, MI, IN, IL, WI, MN, IA, MO, ND, SD, NE, and KS. Southern states include VA, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, and TX. Finally, western states are MT, AZ, CO, ID, WY, UT, NV, NM, CA, OR, WA, AK, and HI.

[6]The Nixon-Ford term is estimated from 1969:2-1976:12 exclusive of gaps in the following places: for 1972:7-1972:10, 1973:3-1973:4, 1974:8, and 1976:7-1976:12. Reagan's term is estimated from 1981:2-1984:12.

The inflation series employed in each analysis is that employed in the aggregate model as are the honeymoon and Watergate dummy variables. Since the Reagan administration is estimated for the first term only, no Iran variable is included in this analysis. The unemployment series employed throughout is also the series used in the aggregate model, though we examine the possibility that minorities (whites), for example, may be more concerned with the minority (white) unemployment rate than the overall rate. This analysis is also carried out for men and women and for geographical region.

The model to be estimated for each classification and each regime is as follows:

$$Y_\alpha = \delta_\alpha(\alpha_0 + \alpha_1 P^e + \alpha_2 U^e) + (1-\delta_\alpha)Y\alpha_{-1} + \alpha_3 Honey + \epsilon_\alpha \qquad (5.1)$$

$$Y_\beta = \delta_\beta(\beta_0 + \beta_1 P^e + \beta_2 U^e) + (1-\delta_\beta)Y\beta_{-1} + \beta_3 Honey + \epsilon_\beta \qquad (5.2)$$

where Y_α and Y_β, δ_α and δ_β represent the dependent variable and adjustment processes respectively of two groups. The model may be expanded to include as many categories as necessary.[7] The merit of estimating the model in this

[7]Two modifications must be made for the Nixon-Ford administration. First, since the data disaggregated by race begins in 1970 there is no honeymoon variable for this set

fashion is that the α_i and β_i coefficients are the equilibrium values which exist after all adjustments have been made. Hypothesis tests may thus be applied directly to the equilibrium values.[e] The equation is estimated as a quadratic in inflation and unemployment to yield the desired concave social preference functions.

5.3 The Estimation Technique

The popularity function presented in the previous section could be estimated for each disaggregate category individually by nonlinear least squares. This estimation technique implicitly assumes, however, that the different regressions do not contain any common unmeasurable or omitted factors at a given point in time. Given that each group has the same information, this assumption is not likely to hold. Whites and minorities, for example, are both affected the President's handling of domestic violence and other issues which are not accounted for in the model. This contemporaneous correlation should be accounted for in the estimation of the model and thus we employ a seemingly unrelated regressions (SUR) estimation technique for the disaggregated analysis.

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of regressions. Second, the Nixon-Ford equation also includes the Watergate dummy variable.

[e]See Smyth, Washburn, and Dua (1989a) and Section 3.7.2 of this volume for more information.

As Kennedy (1985, 141) relates, SUR consists of creating a block matrix similar to that created in Chapter 2. If we assume two subgroups, the system may be expressed as

$$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} X_1 & 0 \\ 0 & X_2 \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \end{bmatrix} \qquad (5.3)$$

$$y^* = X^*\beta^* + \epsilon^*$$

where each y_i, β_i, and ϵ_i are vectors and X_i is a data matrix.

If we assume contemporaneous correlation between the error terms across the two equations so that ϵ_2 is correlated with ϵ_1, the variance-covariance matrix of ϵ will not be diagonal. By using the residuals from each equation estimated separately we may estimate these error correlations and the diagonal elements. This allows estimation of the variance-covariance matrix of ϵ^* and generation of estimated generalized least squares (EGLS) estimates of β^*.

Judge, et. al. (1988, 443-453) indicate that SUR estimates are better than OLS in this case because it allows for the correlation between error vectors. Furthermore, it uses information on explanatory variables that are included

in the system but which are excluded from the individual system.

5.3 The Choice of an Unemployment Rate

At this juncture we could simply estimate equations 5.1 and 5.2 by SUR for each disaggregated group to obtain group-specific responses to changes in inflation and unemployment. Before undertaking this task, however, it is of interest to explore whether these groups are more concerned with the unemployment rate directly influencing them (the "local" rate), or the overall, or national, unemployment rate. Do minorities, for example, judge the President's performance based upon the minority unemployment rate or the overall unemployment rate?

Davidson and MacKinnon (1981) indicate that this issue may be resolved by including local and national unemployment rates in the same regression. If the coefficients of both rates are statistically insignificant then it is not possible to reject either hypothesis. If one is significant while the other is insignificant, then the variable with the significant coefficient is deemed superior. If both coefficients are significant then both measures add important information and should be included. Models using just one measure are rejected. We thus modify equations 5.1 and 5.2 to include local unemployment rates. Taking minorities vs. whites as an example, the equations become

$$YW = \delta_w(\alpha_0 + \alpha_1 P^2 + \alpha_2 U^2 + \alpha_3 UW^2) + (1-\delta_w)YW_{-1} + \alpha_4 Honey + \epsilon_w \quad (5.4)$$

$$YM = \delta_m(\beta_0 + \beta_1 P^2 + \beta_2 U^2 + \beta_3 UM^2 + (1-\delta_m)YM_{-1} + \beta_4 Honey + \epsilon_m \quad (5.5)$$

where YW and YM refer to popularity by whites and minorities respectively and UW and UM refer to the monthly white and minority unemployment rates, seasonally adjusted, lagged one month. All other variables are as defined previously. Table 5.1 gives the results of this estimation for the Nixon-Ford and Reagan administrations.[9] The unemployment coefficients are insignificant in both equations, due in large part to multicollinearity between the two variables. We are thus unable to reject either unemployment rate in favor of the other from this analysis.

Table 5.2 presents the results of a similar analysis disaggregated by sex. The local unemployment rates included in the regressions are those for men and women, lagged one month, seasonally adjusted. For Nixon-Ford and Reagan and for men and women both unemployment rates are insignificant,

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[9]Preliminary research indicated that the macroeconomic variables for the Carter administration are statistically insignificant in every disaggregate analysis. Since these results do not markedly increase our knowledge, in most cases we do not report findings for the Carter administration in order to conserve space.

though the national unemployment rate is closer to significance in most cases. It is therefore not possible from the Davidson-MacKinnon test to distinguish between the national and local unemployment rates for women and men.

The Bureau of Labor Statistics provides monthly regional unemployment rates for 1978-1988, making it possible to conduct a similar national vs. local unemployment analysis by geographical region for the first Reagan term.[10] Though there are slight differences in the states included in the Census division and the Gallup division, these differences are relatively minor.[11]

The results of the Davidson-MacKinnon regressions by region are found in Table 5.3.[12] Unlike the previous disaggregated analyses, these results allow us to make

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[10]Recall that monthly disaggregated Gallup data is not available for the second Reagan term.

[11]The census and Gallup divisions for "West" and "Midwest" are identical. The Census classification of states in the Northeast is smaller than the corresponding "East" category used in Gallup analysis. Gallup includes MD, DE, WV, and Washington, D.C. as "East" while the Census classifies these states as "South".

[12]The Durbin h-statistic for the South is greater than the critical value, indicating the possible presence of serially corelated errors. When we corrected the equation for serial correlation, the resulting value of rho was 0.092. Fomby, Hill, and Johnson (1984, 214) indicate that if the absolute value of rho is less tha 0.3 then very little loss is associated with failure to correct for serial correlation. In addition, the Durbin m-statistic for this equation was 0.387, indicating no presence of serially correlated errors. Kmenta (1986, 333) states "all things considered, the m test is to be preferred to the h test." For these reasons, we do not correct the South equation for autocorrelation.

definitive statements with respect to the appropriate unemployment rate. For three regions, South, East, and West, the national unemployment rate is highly significant and the local rate is insignificant. Only for the Midwest is the regional rate accepted and the national rate rejected. When we examine the mean regional unemployment rates, the Midwest mean, 9.78%, is more than one percentage point higher than either of the other regional rates or the national rate and its standard deviation is larger as well. The recession of the early eighties was felt most in this region and the regional rate most effectively captures this large divergence from the national rate of unemployment. In general, however, the local rate is rejected in favor of the national rate.

In the remainder of this chapter dealing with disaggregated groups, we use the overall or national unemployment rate in our regression analysis for two reasons. First, in all cases either (1) the local rate was rejected in favor of the national rate or (2) we could not reject either rate in favor of the other. Second, if we use the national unemployment rate in all regressions it is possible to conduct rigorous tests comparing responses to unemployment between groups. This analysis would not be possible if we used a different rate in each regression.

5.5 Disaggregation by Race

5.5.1 Estimates for the Reagan Administration

Applying SUR estimation to equations 5.1 and 5.2 for the Reagan period 1981:2-1984:12 yields the results presented in Table 5.4.[13] All coefficients for both equations are statistically significant and the Durbin h-statistics indicate no presence of serially correlated errors in either equation. The adjusted R^2 figures indicate that the economic factors do a far better job of explaining error variance for whites than for minorities.

Are the differences in the coefficients across whites and minority groups significant? To test the validity of restrictions that cross equation coefficients are equal, we apply the Wald test. According to Kmenta (1986, 492) this test is based on the extent to which the restrictions are violated when restricted rather than unrestricted estimates are used. The Wald test statistic is distributed asymptotically as a chi-square with degrees of freedom equal to the number of restrictions being tested.[14]

Column 1 of Table 5.5 gives the calculated chi-square values for several null hypotheses for the Reagan administration. If we examine first the null hypothesis that the intercept coefficients are equal (H_0: $\alpha_0 = \beta_0$) the

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[13]We use Time Series Processor (TSP) to generate these results. Following Judge, et. al. (1988, 551-555) we estimate the nonlinear system of seemingly unrelated regressions by a maximum likelihood technique.

[14]TSP generates this test statistic.

calculated chi-square value is larger than the relevant critical chi-square value. From this information we reject the null hypothesis that the intercepts are equal.

With respect to economic perceptions, we may examine if reactions to inflation are similar between whites and minorities. The chi-square value indicates that we cannot reject the null hypothesis that the two are equal.

There is a large difference in the unemployment coefficients between the two groups and in a counterintuitive direction. Initially one would think that minorities who typically bear the larger burden of unemployment would punish increases in it more. This is not borne out by our evidence. The calculated chi-square value for the null hypothesis that unemployment perceptions are equal is far larger than the critical value. Thus, whites and blacks responded to unemployment in the Reagan years quite differently, though we did not anticipate <u>a priori</u> that whites would punish unemployment more severely than minorities.

The Wald test may also be applied to the nonlinear restriction that the slopes of the two indifference curves are equal. We test the restriction (from equations 5.1 and 5.2) that $\alpha_2/\alpha_1 = \beta_2/\beta_1$ (alternatively, that $\alpha_1\beta_2 - \alpha_2\beta_1 = 0$). The chi-square value presented in the final row of the table is significant with a level of signficance $\alpha = .05$ and

one degree of freedom, thus indicating that the slopes of the two indifference curves are markedly different.

From this analysis of behavior among whites and minorities in the Reagan administration we may conclude that approval ratings by both groups were significantly affected by economic factors. While perceptions toward inflation are equal, it is somewhat surprising that whites punished unemployment far more than did minorities. Finally, since the adjusted R^2 for the white regression is twice as large as that for minorities, we assert that economic factors accounted for a larger portion of error variance for whites than for minorities for the Reagan administration.

5.5.2 Estimates for the Nixon-Ford Administration

Equations 5.1 and 5.2 are modified for the Nixon-Ford administration to include a Watergate variable in both and are estimated for 1970:2-1976:6, excluding the first year of the term due to a lack of data. The results of this estimation are presented in Table 5.6.

The inflation coefficient is statistically significant for whites, though not for minorities and the unemployment coefficient is not statistically significant for either group. The Watergate scandal had a large negative impact on popularity for both groups. The Durbin h-statistic indicates no presence of serially correlated errors.

Did whites and minorities react in an equal manner to economic fluctuations during the Nixon-Ford regime? Column 2 of Table 5.5 presents the calculated chi-square values for several null hypotheses. The chi-square tests indicate that we cannot reject the hypothesis that perceptions toward inflation and perceptions toward unemployment are equal for both groups. The hypothesis that economic perceptions are jointly equal is rejected, however. Given the insignificance of the macroeconomic variables for minorities, these results should be seen as tenuous.

5.5.3 Summary

Our endeavor to explain presidential approval ratings by minorities and whites is most successful for the Reagan administration. The presence of many insignificant variables for the Nixon-Ford regime do not allow us to reach any definitive conclusions. For the Reagan term, however, we find that both groups' approval ratings are significantly influenced by both macroeconomic variables.

5.6 Disaggregation by Sex

5.6.1 Estimates for the Reagan Administration

The results of the estimation of equations 5.1 and 5.2 for the first Reagan term (1981:2-1984:12) by sex are presented in Table 5.7. All coefficients in both equations are statistically significant and the Durbin h-statistics

indicate no presence of serial correlation in the errors. A somewhat larger portion of the error variance is accounted for by the economic variables for men than for women, indicating that forces not accounted for in the model played a larger role in determining approval ratings by women.

Did a "gender gap" exist for the Reagan administration as was perceived by many in the media? The series of chi-square tests for equality of coefficients across groups presented in Table 5.8 shed some light on the subject. Reagan did appear to be better received by men than by women as the intercept term for men is significantly larger than the intercept in the popularity equation for women. The chi-square values from the null hyptheses that inflationary perceptions are equal, that unemployment perceptions are equal, and that the two are jointly equal indicate that there are no perceptible differences in responses to macroeconomic fluctuations. Therefore, we may conclude that while men gave Reagan significantly higher approval ratings thus supporting the "gender gap" hypothesis, it was not due to his economic performance.

5.6.2 Estimation for the Nixon-Ford Administration

Estimation results of the popularity functions of men and women for the Nixon-Ford administration are presented in Table 5.9. The basic equations (5.1 and 5.2) are modified to include a Watergate variable. Both macroeconomic

coefficients are significant and of the anticipated sign for women. The coefficients of both inflation and unemployment are correctly signed for men and both are statistically significant. The Watergate scandal significantly lessened popularity for both groups.

Did macroeconomic fluctuations cause equal responses among women and men for the Nixon-Ford regime? As we examine the results of the chi-square tests in Column 2 of Table 5.8, we see results consistent with those found for the Reagan regime. First, since we reject the null hypothesis that intercept terms are equal, we conclude that Nixon-Ford was significantly *more popular among* men than women. Second, neither inflationary nor unemployment perceptions are significantly different between men and women. The two groups appear to be equally concerned about macroeconomic conditions. The hypothesis that inflation and unemployment are jointly equal for men and women is rejected, thus indicating that macroeconomic fluctuations in general create different responses in women than in men. It is also of interest to note that the adjustment coefficients for men and women are not significantly different for both Republican administrations. Finally, the slope of the social indifference curves is not significantly different for the two groups.

5.6.3 Summary

Our estimation of presidential popularity functions disaggregated by sex is quite successful for both Republican administrations. Both Reagan and Nixon-Ford were significantly more popular among men than among women. Reactions to economic fluctuations were the same among the two groups for both Reagan and Nixon-Ford.

5.7 Disaggregation by Political Party

5.7.1 Estimates for the Reagan Administration

The basic equations (5.1 and 5.2) disaggregated by political party are estimated by SUR for the Reagan term (1981:2-1984:12). The results are presented in Table 5.10 with t-statistics in parentheses. All coefficients appear with the anticipated sign and all are statistically significant with the exception of inflation for the Democrats and the honeymoon for Republicans. The Durbin h-statistics indicate no presence of serially correlated errors. The intercept term for the Republican regression indicates that in the absence of any inflation or unemployment, Reagan's approval rating would be greater than 100 percent. Zero inflation and unemployment rates were never relevant, however, and within the limits of the rates which actually occurred approval ratings predicted by our model are very high but do not exceed 100 percent.

As we compare the coefficients for the three political party groupings, we see large differences in the intercept

terms. Not surprisingly, Reagan was far more popular among Republicans than any other group and far less popular among Democrats. The series of pair-wise chi-square tests presented in Table 5.11 indicate that these differences are statistically significant.

With respect to economic perceptions, the chi-square tests indicate that Independents punished unemployment more than did Democrats, but the Republicans responded in a similar manner to the other two groups.

The three partisan groups responded to changes in inflation in like manner. Though a priori we would expect Democrats to punish increases in unemployment more harshly than Republicans, it is somewhat surprising that our results indicate the two groups punished increases in unemployment equally.

5.7.2 Estimates for the Carter Administration

We initially hoped that our partisan analysis would yield some insight into the reasons why economic performance didn't effect approval ratings for Democratic presidents. For this reason, we present the results for the Carter (1977:3-1980:12) regime in Table 5.12. The results for both Democrats and Independents are in line with those we have found in other estimations of the Carter administration: both macroeconomic variables are statistically insignificant

and the adjusted R^2 is high despite these problems due to the inclusion of the lagged dependent variable.[15]

In light of these problems typically experienced with the Carter administration, the regression results for the Republicans are quite good. Though the inflation coefficient is insignificant, the unemployment coefficient indicates a significantly negative response to increases in unemployment. In addition, the Durbin h-statistic indicates no presence of serial correlation.[16] Unfortunately, this analysis does not appear to yield any new information on the puzzle of insignificant macroeconomic coefficients in Democratic popularity functions.

5.7.3 Estimates for the Nixon-Ford Administration

Regression coefficient estimates for the Nixon-Ford regime disaggregated by political party are presented in Table 5.13 with t-statistics in parentheses. All coefficients are of the anticipated sign and all are statistically significant for both the Republican and the Democratic equations though the unemployment coefficient is

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[15]Both the aggregated results presented in Chapters 2 and 3 and the disaggregated results not reported indicate problems with serially correlated errors and insignificant macroeconomic coefficients.

[16]Since the models for Independents and Democrats include serially correlated errors and insignificant macroeconomic variables, tests for differences between groups are not conducted for the Carter administration.

only marginally significant for Independents. The Watergate affair significantly lessened popularity for each group.[17]

Once more, we explore the differences in coefficient values across parties. The chi-square values for testing the equality of coefficients for the Nixon-Ford administration are found in Table 5.14. First, the pair-wise null hypothesis that intercept terms across the parties are equal is rejected, indicating that Republicans rated Nixon-Ford significantly higher than did the other parties and Democrats rated him significantly lower than did the other parties, consistent with patterns found in the Reagan term.

It is often felt that Republicans are more concerned with inflation than are Democrats. This is borne out by our results for the Nixon-Ford administration. The chi-square tests indicate that Republicans punished inflation significantly more than did Democrats. The difference between the Independent inflation coefficient and that for Democrats is significant as well, though there is no

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[17]The Durbin h-statistic for Independents is greater than its critical value, indicating the possibility of autocorrelated errors. We found the appropriate value of rho to be very low, -0.022. Following Fomby, Hill, and Johnson (1984, 214), since this value is less than 0.3 in absolute terms there is little to be gained from correcting the correlated errors. In addition, the Durbin m-statistic of -1.875 is insignificant. Following Kmenta (1985, 333), we place more weight upon this statistic than upon the h-test. Thus, we continue our analysis with the results as presented in Table 5.13.

significant difference in responses to inflation by Republicans and Independents.

When examining responses to unemployment, Republicans punished the administration significantly more for this macroeconomic condition than did the other two groups. We cannot reject the null hypothesis that Democratic and Independent responses to unemployment are equal. These results are to be taken with some reservation, however, since the Independent unemployment coefficient is only marginally significant.

The adjustment processes of the three groups do not significantly differ. There is no difference in the response to Watergate by the three parties. This result is in contrast to the earlier conclusion of Hibbs (1982) that Democrats were more harsh than Republicans in response to Watergate.

5.7.4 Conclusions

We have examined presidential approval ratings by Democrats, Republicans, and Independents for the Reagan, Carter, and Nixon-Ford administrations. We have been far more successful in our estimation of the Republican administrations than of the Democratic administrations. We had initially hoped that this disaggregation by political party would help resolve this dilemma. Unfortunately, no complete explanation has emerged.

5.8 Disaggregation by Geographical Region

5.8.1 Estimates for the Reagan Administration

The results of estimation by SUR of Reagan's popularity among those in the East, Midwest, South, and West are presented in Table 5.15. All coefficients are statistically significant and have the anticipated sign. In addition, the h-statistic indicates no presence of serially correlated errors for East, West, and Midwest. Since the South's h-statistic is larger than the critical value, we correct the equation for serial correlation. The resulting value of rho is 0.161. Since this is less than 0.3, Fomby, Hill, and Johnson (1984, 241) indicate that there is little to gain by correcting the correlated errors. Thus, our remaining tests are conducted on the model as presented in Table 5.15.[18]

Making comparisons among regions becomes quite cumbersome as there are so many groups for which pairwise tests must be made. Table 5.16 attempts to make an orderly presentation of the chi-square results of tests for equality of coefficients across geographical regions. The cell in the first row, first column of the grid presents results of pairwise tests between East and West; the cell in the first row, second column compares East and Midwest and so forth.

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[18]The Durbin m-statistic for the South equation is 0.293, less than the critical value. As note 12 indicates, Kmenta (1986, 333) indicates that the m-test is preferred to the h-test. This is another reason for not correcting for serial correlation.

Within each cell the first figure is the test statistic for the null hypothesis that all coefficients are equal. The second number is the test statistic for the null hypothesis that intercepts are equal. The null hypothesis for these and the remaining statistics is given in the far right hand column of the table.

Perhaps the most striking feature of this analysis is found in Column 3 of Table 5.16. With the exception of the adjustment process and the slope of the indifference curve, all the coefficients for the South are significantly different from those for all other regions. Thus, when examining the magnitudes of the coefficients for the various regions in Table 5.15, Reagan appears to have been significantly more popular in the South than in other regions as evidenced by the larger intercept term. This may not be too surprising given the emergence of both religious and political conservatism as a political force in the region in the past decade.

What is more surprising, however, is that the coefficients of both inflation and unemployment for the South are significantly larger than the corresponding responses in all other regions. The South appears to have punished (rewarded) Reagan significantly more for macroeconomic malaise (prosperity) than did other regions. From this analysis, we may assert that Southerners were more

apt to be concerned with the economic realities of Reagan's policies than were their counterparts in other regions.

While the coefficient values for the South are significantly different from all other regions, the slope of the South's social indifference curve is equal to that of both the West and the Midwest. This indicates that while the coefficients may be different, the ratio of the coefficients of inflation to unemployment are not. Only when comparing East to South are the slopes significantly different.

5.8.2 Estimates for the Nixon-Ford Administration

Estimation results for the regional analysis of the Nixon-Ford administration are found in Table 5.17. Both macroeconomic coefficients are statistically significant for the East, Midwest and South. The inflation coefficient in the Midwest equation is only marginally significant, though it is of the expected sign. The Watergate scandal had a significantly negative impact popularity in each region. The Durbin h-statistics indicate the presence of serially correlated errors for all equations but the Midwest. When we corrected the equations for autocorrelation, we obtained rho values of 0.212, -0.105, and 0.160 for the East, South, and West, respectively. As we have done previously when the rho values are less than 0.30 in absolute value, we proceed with the values presented in Table 5.17 since little gain in

efficiency may be gained from applying an autocorrelation correction.

The estimated coefficients for inflation, unemployment, and the intercept are larger in absolute terms for the South than for any other region as they were for the Reagan administration. Are they significantly larger? Table 5.18 provides the chi-square values for tests of equality of coefficients across regions in pairwise tests. From the third column we note first that the southern intercept coefficient is significantly larger than all other intercept terms, indicating that Nixon-Ford was more well received in the South than in other regions. With respect to inflation, while the South's coefficient is larger, this difference is significant only by comparison with the West. The southern unemployment coefficient is significantly larger than that for the Midwest though not for the East and West. In sum, economic perceptions are largely equivalent for the South and East. Our results for South and West and for the South and Midwest are somewhat more mixed. It is also of interest to note that all regions punished Nixon for his role in Watergate equally.

5.8.3 Summary

Our disaggregation by region yields meaningful results for the Reagan and Nixon-Ford administrations. We have found that for the Reagan term, Southerners reacted in a

manner significantly different from every other region. Their approval of Reagan was significantly higher than that for other regions, though they punished macroeconomic problems significantly more severely than did survey participants in the other resions. Though Southerners rated Nixon-Ford significantly higher than those in all other regions, the reactions to macroeconomic fluctuations were not significantly more severe across all regions as was the case for Reagan.

5.9 Chapter Summary and Conclusions

This chapter has examined presidential popularity ratings granted by several disaggregated portions of society. We employ Gallup Poll data measuring responses by minorities and whites, men and women, different political parties, and different geographical regions.

Our model tends to explain Reagan's popularity quite well. The inflation coefficient is significant in all regressions except that for Democrats and the coefficient for unemployment is significantly negative for all disaggregated groups. With respect to the Nixon-Ford term, the inflation coefficient is significant for all regressions but those for minorities and the West. The unemployment coefficient for Nixon-Ford is significant in those regressions for Republicans and Democrats, all regions, and for women and men.

Some of the more interesting results of our disaggregated analysis may be summarized as follows:

(1) Though minorities gave Reagan significantly lower popularity ratings than did whites, they punished inflation and unemployment less than did whites. Since several of the macroeconomic coefficients are insignificant for Nixon-Ford, similar conclusions cannot be drawn for this regime.

(2) Our analysis of approval ratings by men and women for Reagan indicates that men gave him significantly higher approval ratings than did women. This confirms the popular notion that Reagan experienced a "gender gap." This gender gap did not manifest itself in economic perceptions, however, as our analysis indicates that women and men responded in like manner to inflation and unemployment. These findings held true for the Nixon-Ford administration as well.

(3) When we began our analysis of approval ratings by political parties we had hopes of finding an explanation of why macroeconomic variables significantly impacted approval of Republican administrations but seemed to have no effect on the approval rating of Democratic presidents. Unfortunately, our analysis has yielded no such insights.

Both Reagan and Nixon-Ford were significantly more popular amongst their own party members. For the Reagan administration, Independents punished both macroeconomic variables significantly more than did the members of the

other two parties. It is a bit unusual that Republicans took a more negative view toward unemployment than did Democrats.

(4) With respect to geographical regions, we found that the South, East, and West responded to the national rather than the regional unemployment rate but that this pattern was reversed for the Midwest. The South rated both Reagan and Nixon-Ford higher than did other regions. Southerners also had significantly larger negative responses to inflation and unemployment as compared to all other regions for Reagan, although this pattern did not hold for the Nixon-Ford regime.

Table 5.1
Tests of Appropriate Unemployment Rate by Races
(t-statistics in parentheses)

	Nixon-Ford		Reagan	
	Minorities	Whites	Minorities	Whites
Intercept	29.09 (9.26)	63.87 (22.92)	25.41 (7.96)	77.51 (25.83)
P^2	-0.04 (-1.29)	-0.10 (-3.32)	-0.06 (-2.84)	-0.07 (-3.23)
U^2	0.05 (0.25)	-1.39 (-1.93)	0.03 (0.09)	-0.03 (-0.09)
UM^2	-0.01 (-0.13)		-0.16 (-0.43)	
UW^2		1.49 (1.74)		-0.40 (-1.13)
Water	-9.48 (-3.57)	-9.66 (-4.21)		
Honey			1.12 (3.56)	1.16 (5.78)
Adjustment	0.68 (7.18)	0.45 (5.73)	1.03 (7.80)	0.72 (8.03)
Adjusted R^2	0.77	0.84	0.40	0.90
Durbin h-stat.	-0.349	0.698	0.497	0.881

Table 5.2
Tests of Appropriate Unemployment Rate by Sexes
(t-statistics in parentheses)

	Nixon-Ford		Reagan	
	Men	Women	Men	Women
Intercept	68.68 (19.65)	60.82 (15.41)	80.10 (20.64)	68.98 (15.53)
P^2	-0.10 (-3.38)	-0.07 (-2.49)	-0.10 (-3.57)	-0.09 (-2.95)
U^2	-1.11 (-1.66)	0.65 (-0.17)	-0.38 (-1.26)	-0.36 (-1.90)
UM^2	0.99 (1.38)		0.08 (0.32)	
UW^2		-0.20 (-0.54)		0.08 (0.34)
Water	-11.16 (-4.87)	-12.73 (-5.69)		
Honey	0.32 (1.62)	0.40 (2.05)	1.03 (5.10)	1.13 (3.72)
Adjustment	0.49 (6.74)	0.55 (7.12)	0.61 (6.38)	0.83 (6.99)
Adjusted R^2	0.91	0.90	0.94	0.80
Durbin h-stat.	1.105	-0.540	-0.388	-0.069

Table 5.3
Tests of Appropriate Unemployment Rate by Region
Reagan Administration
(t-statistics in parentheses)

	East	Midwest	South	West
Intercept	68.01 (30.03)	69.27 (30.23)	82.95 (35.67)	74.10 (24.29)
P^2	-0.05 (-2.27)	-0.04 (-2.06)	-0.13 (-5.99)	-0.09 (-3.00)
U^2	-0.25 (-5.86)	-0.06 (-1.11)	-0.30 (-5.55)	-0.26 (-3.29)
East U^2	0.01 (0.29)			
Midwest U^2		-0.14 (-4.46)		
South U^2			-0.09 (-1.54)	
West U^2				0.01 (0.11)
Honeymoon	1.10 (4.16)	1.40 (5.00)	1.57 (5.64)	1.07 (3.91)
Adjustment	0.94 (9.07)	0.99 (9.39)	0.93 (9.05)	0.75 (6.43)
Adjusted R^2	0.82	0.82	0.88	0.76
Durbin h-statistic	0.701	-0.025	2.108	-0.448

Table 5.4
Disaggregation by Race for the Reagan Administration
(t-statistics in parentheses)

	Whites	Minorities
α_o, β_o - Intercept	79.77 (35.10)	26.31 (11.45)
α_1, β_1 - Inflation	-0.08 (-3.68)	-0.07 (-3.15)
α_2, β_2 - Unemployment	-0.30 (-12.23)	-0.10 (-4.07)
α_3, β_3 - Honeymoon	1.15 (5.63)	1.11 (3.55)
δ_w, δ_m - Adjustment	0.72 (7.93)	1.02 (7.85)
Adjusted R^2	0.91	0.42
Durbin h-statistic	0.361	0.940

Table 5.5
Chi-Square Tests of Minority & White Responses
(Degrees of Freedom in Parentheses)

Null Hypothesis	Chi-Square Value Reagan	Nixon-Ford
All Coefficients Equal	5963.254* (5)	460.550 (5)
Intercepts Equal	484.786* (1)	101.470* (1)
Inflation Terms Equal	0.426 (1)	2.743 (1)
Unemp. Terms Equal	56.990* (1)	3.174 (1)
Inf. & Unemp. Terms Equal	57.711* (2)	14.010* (2)
Adjustments Equal	4.382* (1)	4.264* (1)
Watergate Equal		0.026 (1)
Slope of Indifference Curve Equal	4.039* (1)	0.706 (1)

*Indicates that the null hypothesis is rejected with the degrees of freedeom in parentheses and significance level of $\alpha = .05$.

Table 5.6
Disaggregation by Race for the Nixon-Ford Administration
(t-statistics in parentheses)

	Whites	Minorities
α_0, β_0 - Intercept	63.47 (22.04)	27.94 (10.06)
α_1, β_1 - Inflation	-0.10 (-3.37)	-0.04 (-1.37)
α_2, β_2 - Unemployment	-0.13 (-1.80)	0.03 (0.40)
α_3, β_3 - Watergate	-10.04 (-4.30)	-9.52 (-3.61)
δ_w, δ_m - Adjustment	0.44 (5.50)	0.68 (7.32)
Adjusted R^2	0.83	0.78
Durbin h-statistic	0.335	0.354

Table 5.7
Disaggregation by Sex for the Reagan Administration
(t-statistics in parentheses)

	Women	Men
α_0, β_0 - Intercept	70.17 (25.27)	79.20 (30.81)
α_1, β_1 - Inflation	-0.08 (-3.22)	-0.10 (-3.89)
α_2, β_2 - Unemployment	-0.30 (-9.74)	-0.29 (-10.47)
α_3, β_3 - Honeymoon	1.10 (3.73)	1.04 (5.35)
δ_T, δ_{men} - Adjustment	0.85 (6.97)	0.61 (6.54)
Adjusted R^2	0.80	0.90
Durbin h-statistic	-1.402	0.356

Table 5.8
Chi-Square Tests of Responses by Women & Men
(Degrees of Freedom in Parentheses)

Null Hypothesis	Chi-Square Value Reagan	Nixon-Ford
All Coefficients Equal	252.754* (5)	21.929* (6)
Intercepts Equal	10.201* (1)	8.619* (1)
Inflation Terms Equal	0.499 (1)	3.545 (1)
Unemp. Terms Equal	0.034 (1)	0.569 (1)
Inf. & Unemp. Terms Equal	0.552 (2)	8.585* (2)
Adjustments Equal	2.769 (1)	0.487 (1)
Watergate Equal		0.453 (1)
Slope of Indifference Curve Equal	0.542 (1)	0.211 (1)

*Indicates that the null hypothesis is rejected with the number of degrees of freedom in parentheses and significance level of $\alpha = .05$.

Table 5.9
Disaggregation by Sex for the Nixon-Ford Administration
(t-statistics in parentheses)

	Women	Men
α_0, β_0 – Intercept	59.01 (27.43)	65.03 (26.17)
α_1, β_1 – Inflation	-0.07 (-2.86)	-0.12 (-4.03)
α_2, β_2 – Unemployment	-0.14 (-2.62)	-0.18 (-2.85)
α_3, β_3 – Honey	0.41 (2.07)	0.34 (1.72)
α_4, β_4 – Watergate	-12.51 (-5.64)	-11.06 (-4.77)
δ_t, δ_{men} – Adjustment	0.54 (7.10)	0.48 (6.61)
Adjusted R^2	0.90	0.91
Durbin h-statistic	-0.432	1.511

Table 5.10
Disaggregation by Partisan Party for the Reagan Administration
(t-statistics in parentheses)

	Democrats	Republicans	Independents
Intercept	41.11 (10.14)	104.82 (50.17)	77.32 (34.91)
Inflation	-0.06 (-1.43)	-0.07 (-3.49)	-0.10 (-4.68)
Unemployment	-0.17 (-3.83)	-0.25 (-10.89)	-0.30 (-12.22)
Honeymoon	1.16 (4.12)	0.25 (1.04)	1.35 (5.35)
Adjustment	0.52 (5.01)	0.95 (8.58)	0.88 (7.98)
Adjusted R^2	0.85	0.73	0.86
Durbin h-statistic	0.215	0.035	0.717

Table 5.11
Chi-Square Tests of Responses by Partisan Parties
Reagan Administration
(Degrees of Freedom in Parentheses)

	Democrats v. Republicans	Democrats v. Independents	Republicans v. Independents
All Coefficients Equal	4415.760* (5)	927.900* (5)	4050.005* (5)
Intercepts Equal	226.270* (1)	90.276* (1)	135.022* (1)
Inflation Equal	0.050 (1)	1.099 (1)	2.011 (1)
Unemployment Equal	3.493 (1)	9.110* (1)	3.146 (1)
Inflation & Unemp. Equal	3.501 (2)	9.417* (2)	4.348 (2)
Adjustments Equal	8.758* (1)	6.738* (1)	0.233 (1)
Indifference Curve Slopes Equal	0.106 (1)	0.001 (1)	0.642 (1)

*Indicates that the null hypothesis is rejected with degrees of freedom in parentheses and significance level of $\alpha = .05$.

Table 5.12
Disaggregation by Partisan Party for the Carter Administration
(t-statistics in parentheses)

	Democrats	Republicans	Independents
Intercept	49.52 (6.25)	47.22 (6.60)	59.28 (7.02)
Inflation	-0.06 (-1.75)	-0.01 (-0.23)	-0.06 (-1.51)
Unemployment	0.23 (1.09)	-0.53 (-2.74)	-0.42 (-1.82)
Honeymoon	1.04 (2.31)	2.11 (4.25)	1.72 (3.51)
Adjustment	0.52 (6.35)	0.54 (6.49)	0.49 (6.47)
Adjusted R^2	0.75	0.80	0.82
Durbin h-statistic	3.066	1.421	3.014

Table 5.13
Disaggregation by Partisan Party for the
Nixon-Ford Administration
(t-statistics in parentheses)

	Democrats	Republicans	Independents
Intercept	43.43 (22.86)	91.00 (47.91)	60.89 (25.40)
Inflation	-0.05 (-2.30)	-0.12 (-6.03)	-0.10 (-3.84)
Unemployment	-0.10 (-2.08)	-0.23 (-4.83)	-0.11 (-1.86)
Honeymoon	0.87 (4.18)	-0.21 (-1.08)	0.43 (1.52)
Watergate	-13.79 (-7.26)	-11.43 (-6.79)	-14.22 (-6.27)
Adjustment	0.63 (9.82)	0.58 (8.05)	0.69 (9.37)
Adjusted R^2	0.88	0.99	0.80
Durbin h-statistic	1.315	0.519	2.053

Table 5.14
Chi-Square Tests of Responses by Partisan Parties
Nixon-Ford Administration
(Degrees of Freedom in Parentheses)

	Democrats v. Republicans	Democrats v. Independents	Republicans v. Independents
All Coefficients Equal	3132.416* (6)	520.366* (6)	1221.386* (6)
Intercepts Equal	557.779* (1)	92.565* (1)	220.704* (1)
Inflation Equal	12.331* (1)	7.165* (1)	1.164 (1)
Unemployment Equal	6.570* (1)	0.073 (1)	5.315* (1)
Inflation & Unemp. Equal	37.493* (2)	10.722* (2)	11.925* (2)
Adjustments Equal	0.407 (1)	0.724 (1)	1.872 (1)
Watergate Equal	1.298 (1)	0.053 (1)	1.818 (1)
Indifference Curve Slopes Equal	0.031 (1)	0.949 (1)	0.899 (1)

*Indicates that the null hypothesis is rejected with degrees of freedom in parentheses and significance level of $\alpha = .05$.

Table 5.15
Disaggregation by Region for the Reagan Administration
(t-statitics in parentheses)

	East	Midwest	South	West
Intercept	61.28 (28.38)	71.42 (23.69)	82.28 (33.19)	74.03 (24.93)
Inflation	-0.05 (-2.33)	-0.06 (-2.11)	-0.13 (-5.40)	-0.09 (-3.05)
Unemployment	-0.27 (-10.21)	-0.26 (-7.94)	-0.37 (-13.52)	-0.25 (-7.75)
Honeymoon	1.05 (4.04)	1.16 (3.97)	1.47 (5.24)	1.08 (3.94)
Adjustment	0.83 (8.15)	0.79 (7.08)	0.88 (8.47)	0.76 (7.03)
Adjusted R^2	0.82	0.80	0.87	0.77
Durbin h-stat.	0.00	-0.922	1.791	-0.414

Table 5.16
Chi-Square Values by Region
Reagan Administration

	West	Midwest	South	
East	65.880*	43.101*	79.163*	All Terms
	2.429	1.347	30.480*	Intercept
	0.909	0.105	9.102*	Inflation
	0.185	0.028	12.641*	Unemp.
	1.314	0.159	18.230*	Inf & Un.
	0.383	0.687	0.000	Adjustment
	1.193	0.136	3.160	Slopes
West		10.309	18.896*	All Terms
		0.415	6.049*	Intercept
		0.470	2.063	Inflation
		0.068	9.390*	Unemp.
		0.629	10.118*	Inf & Un.
		0.026	0.028	Adjustment
		0.008	0.031	Slopes
Midwest			15.501*	All Terms
			12.859*	Intercept
			5.129*	Inflation
			9.957*	Unemp.
			12.916*	Inf & Un.
			0.445	Adjustment
			1.209	Slopes

*Indicates significant differences at the significance level $\alpha = .05$. The degrees of freedom for the null hypothesis that all coefficients are equal is 5 that inflation and unemployment are equal is 2 and that inflation, unemployment, intercepts, adjustments, and slopes are individually equal is 1.

Table 5.17
Disaggregation by Region for the Nixon-Ford Administration
(t-statistics in parentheses)

	East	Midwest	South	West
Intercept	63.26 (25.96)	60.15 (30.16)	69.09 (37.99)	60.00 (27.39)
Inflation	-0.09 (-2.99)	-0.08 (-3.30)	-0.10 (-4.63)	-0.05 (-1.85)
Unemployment	-0.22 (-3.61)	-0.12 (-2.43)	-0.25 (-5.44)	-0.20 (-3.54)
Honeymoon	-0.07 (-0.37)	0.45 (2.16)	0.10 (0.43)	0.68 (2.41)
Watergate	-13.13 (-5.14)	-13.37 (-6.27)	-15.08 (-6.76)	-18.76 (-6.52)
Adjustment	0.47 (5.86)	0.60 (8.83)	0.72 (9.72)	0.73 (8.43)
Adjusted R^2	0.99	0.88	0.86	0.83
Durbin h-statistic	3.169	0.716	3.346	2.918

Table 5.18
Chi-Square Values by Region
Nixon-Ford Administration

	West	Midwest	South	
East	11.575	12.175	46.280*	All Terms
	1.364	1.139	5.182*	Intercept
	1.529	0.063	0.171	Inflation
	0.153	1.740	0.216	Unemp.
	2.910	2.941	0.794	Inf & Un.
	2.616	0.005	0.419	Watergate
	5.481*	1.539	6.302*	Adjustment
	0.007	0.395	0.000	Slopes
West		11.629	60.186*	All Terms
		0.005	19.650*	Intercept
		1.821	4.957*	Inflation
		1.892	1.232	Unemp.
		2.430	11.923*	Inf & Un.
		3.754	1.561	Watergate
		1.978	0.005	Adjustment
		2.282	0.007	Slopes
Midwest			48.721*	All Terms
			29.074*	Intercept
			1.146	Inflation
			8.905*	Unemp.
			19.298*	Inf & Un.
			0.634	Watergate
			2.544	Adjustment
			0.903	Slopes

*Indicates significant differences at the significance level $\alpha = .05$. The degrees of freedom for the null hypothesis that all coefficients are equal is 6, that inflation and unemployment are equal is 2 and that inflation, unemployment, intercepts, slopes, and adjustments are individually equal is 1.

CHAPTER 6

Summary and Conclusions

This thesis provides an empirical examination of the relationship between presidential popularity and macroeconomic variables, specifically inflation and unemployment. Presidential popularity is measured by the percentage who give a positive response to the Gallup Poll question, "Do you approve or disapprove of the way Mr. _____ is handling the job of President?" We utilize monthly data from the Eisenhower administration through the Reagan regime, January 1953 through December 1988.

From an estimated presidential popularity function it is possible to derive a social preference function. This function is essentially an indifference curve between inflation and unemployment such that each point along the curve represents a combination of the macroeconomic variables which yields a constant popularity rating. Economic theory indicates that the social preference curve is concave to the origin.

Our examination of the existing empirical literature on the presidential popularity function brought to light several areas for improvement. The following paragraphs will in turn summarize (1) several deficiencies in the current literature and (2) the manner in which these issues have been addressed in this body of work. In doing so we

will highlight the novel contributions this work makes to the literature.

First, much of the existing literature assumes that the public's perceptions with respect to inflation and unemployment have remained constant over time. Along a similar vein, most research implicitly assumes that the public holds each president equally responsible for economic fluctuations despite differences in campaign promises, party affiliations, and cooperation from the Congress and the Federal Reserve. It is unlikely that these perceptions have remained constant over time.

We estimated our presidential popularity function in a "sets of equations" framework. By employing this format, we were able to conduct a series of F-tests which indicated that economic perceptions and the extent to which the public holds a president responsible for the economy have indeed varied across administrations. Since these perceptions differ, it is appropriate to estimate the presidential popularity function in a manner which allows all coefficients to vary rather than restricting intercept and/or slope coefficients to be equal across regimes. This empirical finding paves the way for future analyses of why and how the public's perceptions change as presidential administrations change.

Second, though there is a firm theoretical basis for a concave social preference function, with few exceptions the

presidential popularity function has been estimated in such a manner as to yield a linear trade-off between inflation and unemployment. Our presidential popularity function is estimated as a quadratic, including inflation and unemployment in their squared form, so that the resulting social preference curve is concave to the origin as predicted by theory.

Third, to date we have seen no empirical estimations for the Reagan administration utilizing Gallup Poll data. Since the Reagan term is now complete, we examined this regime as well.

When we assessed the estimated presidential popularity functions for the regimes, we found that both inflation and unemployment were highly significant for the Republican administrations, but that neither was significant for the Democratic presidencies. Though insignificant economic coefficients for Democratic administrations are not without precedent in the literature, it is nonetheless surprising that economic factors play no role in determining the popularity of Democratic presidents. We hope that further research efforts will yield a more satisfying explanation for this result.

The differences between Republican and Democratic presidencies caused us to explore the possibility that there is a separate popularity function for Democratic regimes and for Republican regimes. An additional series of F-tests

indicated that there are indeed differences in slope and intercept coefficients among Republicans and among Democrats. A graphical representation of the social preference curves for Eisenhower, Nixon-Ford, and Reagan reveals that the slopes and positions of the popularity curves for each regime at a constant approval level are indeed quite different. The Eisenhower curve is much flatter and typically lies closer to the origin than do the curves for Nixon-Ford and Reagan. In light of the popular impression that Reagan's popularity was "teflon" coated, it is not surprising that his curve lies farthest from the origin.

Fourth, firmly entrenched in the literature is the political business cycle hypothesis: an administration will seek to increase popularity prior to an election by exploiting an expectations augmented short-run Phillips curve, causing unemployment to decline at the expense of higher inflation. As inflationary expectations are revised upward, unemployment returns to its natural rate typically accompanied by a higher inflation rate and lower popularity ratings, hopefully after the election. Though empirical researchers have sought to determine the existence of a political business cycle, they have not examined the extent to which a president can actually experience gains in popularity due to political business cycle maneuverings.

In order to assess the popularity gains possible from political business cycle activity, we estimated a short-run expectations augmented Phillips curve for each Republican administration. We used the estimated values from the Phillips curves and popularity functions to ascertain the popularity rate at the natural rate of unemployment, at the popularity maximizing position (the tangency position between the Phillips curve and the popularity function), and the increase in popularity for a series of expected inflation rates. For Reagan, Nixon-Ford, and Eisenhower these gains were extremely small. In our opinion, they were so small as to give an informed presidency little incentive to induce a political business cycle.

Finally, our analysis turned from aggregate to disaggregate popularity models. We found that the existing body of research which examines popularity ratings by members of different races, sexes, geographical regions and political parties suffers the same shortcomings as the literature on the aggregate popularity function. Thus our disaggregate functions are estimated for individual regimes and include inflation and unemployment in their squared form.

Using monthly data for the Nixon-Ford and the first Reagan administrations, we addressed two basic issues in our disaggregate models. First, we examined whether individuals are more responsive to a local or group-specific

unemployment rate or to the national unemployment rate. We found that for whites and minorities as well as for men and women there is no distinction between the two rates. For geographical regions, however, we found that the national unemployment rate is significantly superior to the regional rate for all regions but the Midwest.

Our second objective in the disaggregated model was to test for significant differences in responses between groups. We found that minorities and whites do respond differently to economic fluctuations. Though minorities typically gave the Republican presidents lower ratings, in general they did not punish increases in unemployment and inflation as severely. There was no significant difference in economic responses between men and women for the Reagan and for Nixon-Ford administrations, though the male "base" approval rating was higher in both cases than was women's. The most striking result in the geographical region model is that while the South granted Reagan significantly higher ratings, they were most harsh in their responses to increasing inflation and unemployment rates. With respect to party affiliations, Independents appeared to hold the Republican presidents most responsible for economic fluctuations.

In sum, this body of work makes several positive contributions to the estimation of the presidential popularity function. We have established that economic

perceptions do not remain constant across administrations and thus all coefficients should be allowed to vary for each regime. Second, the presidential popularity function was estimated in a manner which allows the resultant social preference curves to be concave to the origin. Finally, we have shown that while it may be possible for a president to generate a political business cycle, the rewards from this activity in terms of increased popularity are so small as to make this option unattractive.

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APPENDIX I

Summary of Empirical Work on the Estimation of Presidential Popularity Functions

List of Abbreviations

AJPS - American Journal of Political Science

APSR - American Political Science Revies

JOP - Journal of Politics

Pol. Meth. - Political Methodology

Pub. Choice - Political Choice

POQ - Public Opinion Quarterly

RESTAT - Review of Economics and Statistics

SEJ - Southern Economic Journal

In the tables which follow, * indicates statistical significance at $\alpha = .05$.

Article	Chappell RESTAT, 1983	Chappell & Keech APSR, 1985
Dependent Variable	Gallup Quarterly 57:1-80:4	Gallup Quarterly 57:1-80:4
Lagged Dep. Variable	No	No
Economic Variables	Inflation Output Ratio Q/Q^N (Minimizes quadratic loss function)	Inflation Output Ratio Q/Q^N
Noneconomic Variables	Reciprocal of Time Trend # Killed in Vietnam Watergate	6 Honeymoon Dummies, (1 for eath of 1st 6 months) # Killed in Vietnam Watergate Dummy to assure that performance of previous adms. doesn't affect current one
Presidential Dummies	Yes	Yes
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	Nonlinear Least Squares	Nonlinear Least Squares
Autocorrelation Present?	Yes, Corrected by Cochrane-Orcutt	Yes, Corrected by a two-step procedure
Notes	Shows voters are concerned w/future consequences of current policies	

Article	Chappell & Keech Pub. Choice, 1985	Fair RESTAT, 1978
Dependent Variable	Gallup Quarterly 61:1-80:4	% vote for Democrats in Presidential elections; 1916-1976
Lagged Dep. Variable	No	No
Economic Variables	Money Growth Moving Ave. of Inflation Trend Growth of Output	Unemployment* Real GNP per capita GNP deflator* (16 measures derived from these)
Noneconomic Variables	Square root of # quarters in office Watergate # Killed in Vietnam 6 honeymoon variables	Time trend* DPER = 1 if Democrat running for re-election; -1 if Republican running for reelection VGA - dummy for personality factors
Presidential Dummies	Yes	No
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	Nonlinear Least Squares	Nonlinear Least Squares
Autocorrelation Present?	Yes, but make no corrections	Does not report D-W statistics
Notes	Assumes President minimizes a money growth loss ftn. $S = (M_t - M_t^*)^2$	Change in real GNP & change in Unemp. affect votes for Pres.; conclusions imply myopic vote

Article	Frey & Schneider Poterba RESTAT, 1978	Golden & AJPS, 1980
Dependent Variable	Quarterly Gallup 53:2-75:2	Quarterly Gallup 53:1-78:4
Lagged Dep. Variable	No	No
Economic Variable	Lagged Inf.* Unemployment* Growth Consptn.* (Included pairwise)	Inf. (6 lags)* Unemp (current & 3 lags)* Change disp. income* (inc. pairwise)
Noneconomic Variables	Popularity level* Increasing trend* Watergate*	Increasing trend for each Pres.* Watergate*
Presidential Dummies	No	No
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	OLS	OLS
Autocorrelation Present?	Yes, corrected by Cochrane-Orcutt	Yes, corrected by Cochrane-Orcutt
Notes	Also estimates policy reaction function; results favor political business cycle	Also estimate policy reaction function; results reject political business cycle

Article	Kenski JOP, 1977	Kenski POQ, 1977
Dependent Variable	Gallup Monthly Eisenhower to Nixon	Gallup quarterly & 1st differences 53:1-74:4
Lagged Dep. Variable	No	No
Economic Variables	Unemployment 6-mo. moving ave. of Unemployment Inflation 6-mo. moving ave. of Inflation Change in each of the previous (Included Separately)	6-mo. moving ave. of food prices 6-mo. moving ave. of general prices*
Noneconomic Variables	None	Rally Points War dummy*
Presidential Dummies	No	No
Regimes estimated jointly or separately	Both	Jointly
Method of Estimation	OLS	OLS
Autocorrelation Present?	Doesn't report D-W statistics	None if using 1st differences Yes, otherwise, but does not correct the problem
Notes		Concludes that while inf. may impact one segment of a term, it does not effect its entirety

Article	Kernell APSR, 1978	Maloney & Smirlock SEJ, 1981
Dependent Variable	Gallup Monthly Truman-Nixon	Gallup, Quarterly Change, 57:1-76:4
Lagged Dep. Variable	Yes*	No
Economic Variables	6-mo. Change in Unemp. 6-mo. Change in CPI*	Inf*dInf* Unemp*dUnemp*
Noneconomic Variables	#Killed in Korea & Vietnam* #Bombings over N. Vietnam* Rally* Honeymoon (6-mo. declining trend)* Watergate*	D_1-1 for 57:1, 61:1, 63:4, 68:1, & 74:7* D_2 -1 for 68:4* D_3 -1 for 57:3, 67:3, 68:3, 70:1, 73:2, & 73:3*
Presidential Dummies	No	No
Regimes estimated jointly or separately	Separately	Jointly
Method of Estimation	OLS	OLS
Autocorrelation Present?	Yes, corrected by instrumental var. technique	No
Notes		Though they do employ a nonlinear popularity ftn., we have had extreme difficulty in reproducing these results

Article	Michaels Pub. Choice, 1986	Monroe POQ, 1978
Dependent Variable	Gallup Quarterly 53:1-76:4	Gallup Monthly 1950-1974
Lagged Dep. Variable	No	No
Economic Variables	Anticipeted Inf. Unanticipated Inf.* Unemployment* Inc. in Taxes Change in each since beginning of term	Unemployment Inflation* Real Pers. Income Standard & Poors Index MilitaryExpend.*
Noneconomic Variables	None	None
Presidential Dummies	Both intercept & slope for some models	No
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	OLS	Almon lag model (24 lags)
Autocorrelation Present?	Yes, Corrected by Cochrane-Orcutt	Yes, Corrected by Cochrane-Orcutt

Article	Monroe Pol. Meth., 1981	Mueller APSR, 1970
Dependent Variable	Gallup Monthly 50:1-74:7	Gallup Monthly Truman-Johnson
Lagged Dep. Variable	No	No
Economic Variables	Unemployment Inflation* Real Pers. Income Interest Rate Trade Balance Military Expend.*	Economic Slump* (measure of unemp.)
Noneconomic Variables	None	Time trend since Pres. took office* (Coalition of Minorities) Rally Binary dummy for Korea & Vietnam*
Presidential Dummies	No	In some models
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	OLS using 1 lag; 24-mo. Almon lag	OLS
Autocorrelation Present?	Yes, Corrected by Cochrane-Orcutt	Yes, Corrected by Cochrane-Orcutt
Notes		Concludes that all presidents are cursed with declining popularity over their terms

Article	Norpoth and Yantek AJPS, 1983	Ostrom & Simon APSR, 1985
Dependent Variable	Monthly Gallup, 1961:1-1980:12 (first differences)	Monthly Gallup, 1953:1-1980:12
Lagged Dep. Variable	No	No
Economic Variables	Inflation Unemployment	Weighted Misery Index*
Noneconomic Variables	None	Legislative Success* Legislative Activity* Conflict w/USSR* Battle deaths* Change in (4) w/ new Pres.* Sympathy* Crisis* Social Unrest Scandal* Int'l Policy* Domestic Policy Personal Events*
Presidential Dummies	No	No
Regimes estimated jointly or separately	Jointly	Jointly
Method of Estimation	Univariate ARIMA	Two Stage Least Squares
Autocorrelation Present?	Eliminated via ARIMA process	Yes, Corrected by ARIMA pre-whitening
Notes	No lag structure in unemp. and inf. when examining entire time period	

Article	Shapiro & Conforto JOP, 1980	Smyth & Dua RESTAT, 1988
Dependent Variable	Gallup Yearly 1947-1975 % change Disapprove	Michigan Survey on Economic Performance Monthly, 82:2-86:11
Lagged Dep. Variable	No	Yes
Economic Variables	Yearly change in Inflation* Yearly change in Unemployment* % change in those feeling they are worse off this year than last*	Inflation* Unemployment*
Noneconomic Variables	None	None
Presidential Dummies	No	No
Regimes estimated jointly or separately	Jointly	Only one regime
Method of Estimation	OLS	Box-Cox Estimation
Autocorrelation Present?	No	No
Notes	Finds that perceptions of the economy are important as well as actual economic values.	The Box-Cox estimation indicates nonlinear social preference curves. Innovative use of data capturing economic approval.

Article	Smyth & Dua Pub. Choice, 1989
Dependent Variable	Michigan Survey on Economic Performance Quarterly, 71:2-86:4
Lagged Dep. Variable	No
Economic Variables	Inflation* Unemployment*
Noneconomic Variables	Honeymoon* Watergate*
Presidential Dummies	Yes*
Regimes estimated jointly or separately	Jointly
Method of Estimation	OLS
Autocorrelation Present?	No
Notes	Found a nonlinear specification superior to a linear one.

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RESEARCH IN PROGRESS
"Structural Change in the Social Preference Function, 1953-1988" with David J. Smyth and Pami Dua.

"Regional Variations in the Social Preference Function Between Inflation and Unemployment," with David J. Smyth.

"Is There a Gender Gap in Economic Perceptions?" with David J. Smyth.

"Do Group-Specific or National Unemployment Rates Influence Perceptions?" with David J. Smyth.

BOOK IN PROGRESS

Inflation, Unemployment, and Public Choice: An Investigation of Macroeconomics and Public Choice Theory with David J. Smyth and Pami Dua.

PAPERS PRESENTED

"The Public's Social Preference Function Between Inflation and Unemployment: An Econometric Estimate Using Gallup Poll Data" at the 1989 meeting of the Southwestern Society of Economists in New Orleans, LA, March 8-11, 1989.

"Misery and President Ford: Macroeconomics and Presidential Popularity," with David J. Smyth and Pami Dua at the Seventh Presidential Conference at Hofstra University, Hempstead, NY, April 6-8, 1989.

"Evidence of Structural Change in the Social Preference Function: An Econometric Analysis Using Gallup Poll Data," with David J. Smyth and Pami Dua to be presented at the Southern Economic Association meeting in Orlando, FL, November 19-21, 1989.

OTHER PROFESSIONAL ACTIVITIES

Refereed papers for Journal of Macroeconomics

PROFESSIONAL AND HONORARY ORGANIZATIONS

American Economic Association
Southern Economic Association
Omicron Delta Epsilon
Phi Kappa Phi

DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Susan Katherine Washburn

Major Field: Economics

Title of Dissertation: "The Macroeconomics of Presidential Popularity"

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination:

June 27, 1989